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USER'S MANUAL LOGISTICS-OVER-THE-SHORE (LOTS) UPDATED SIMULATION MODEL

March 1979

Prepared under
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For the Office of the Secretary of Defense
Office of the Under Secretary of Defense, Research and Engineering
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report provides the documentation supporting a Logistics-Over-the-Shore (LOTS) simulation model. The report describes the model's sequences beginning with the arrival of one or more cargo ships through until the cargo has been delivered to an inland destination. The report also provides the coded main program and all subroutines.

An earlier version of the model was used to support the U.S. Army Trans-Hydro Study. The updated version was used in the OSD-sponsored Joint LOTS

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Test and Evaluation Program to assist in test planning and subsequently the modeling of test results.

The model is an expected value one that makes straightforward calculations based upon fixed values input by the analyst. The model is written in ANSI-FORTRAN.

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I. INTRODUCTION

ORIGIN AND STATUS OF THE MODEL

The forerunner of the present LOTS simulation model was developed to support the U.S. Army Trans-Hydro Craft Study.[1] That model was designed jointly by the U.S. Army Combat Developments Command (USACDC) Systems Analysis Group[2] and the USACDC Transportation Agency. An updated version of this model was used in the LOTS program to aid in the main test planning and to validate planning factors based on test data. This model documentation report is a revised edition of the original report.

Overview of Model

The LOTS model follows an operational sequence as depicted in Figure 1. The simulation begins immediately after the arrival of each of one or more cargo ships off-shore, tracks the movement of cargo — specified as to quantities and kinds — across a beach, and ends with the delivery of all the cargo to a marshaling area.

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[1] U.S. Army Training and Doctrine Command, Transportation School, U.S. Army Trans-Hydro Craft Study 1975-85, December 1973.

[2] U.S. Army Combat Developments Command Systems Analysis Group, Logistics-Over-the-Shore (LOTS) Simulation Model Documentation, ACN 14310, SA Group Technical Report 11-72, U.S. Army Combat Developments Command, Ft. Eustis, Va., 1972.

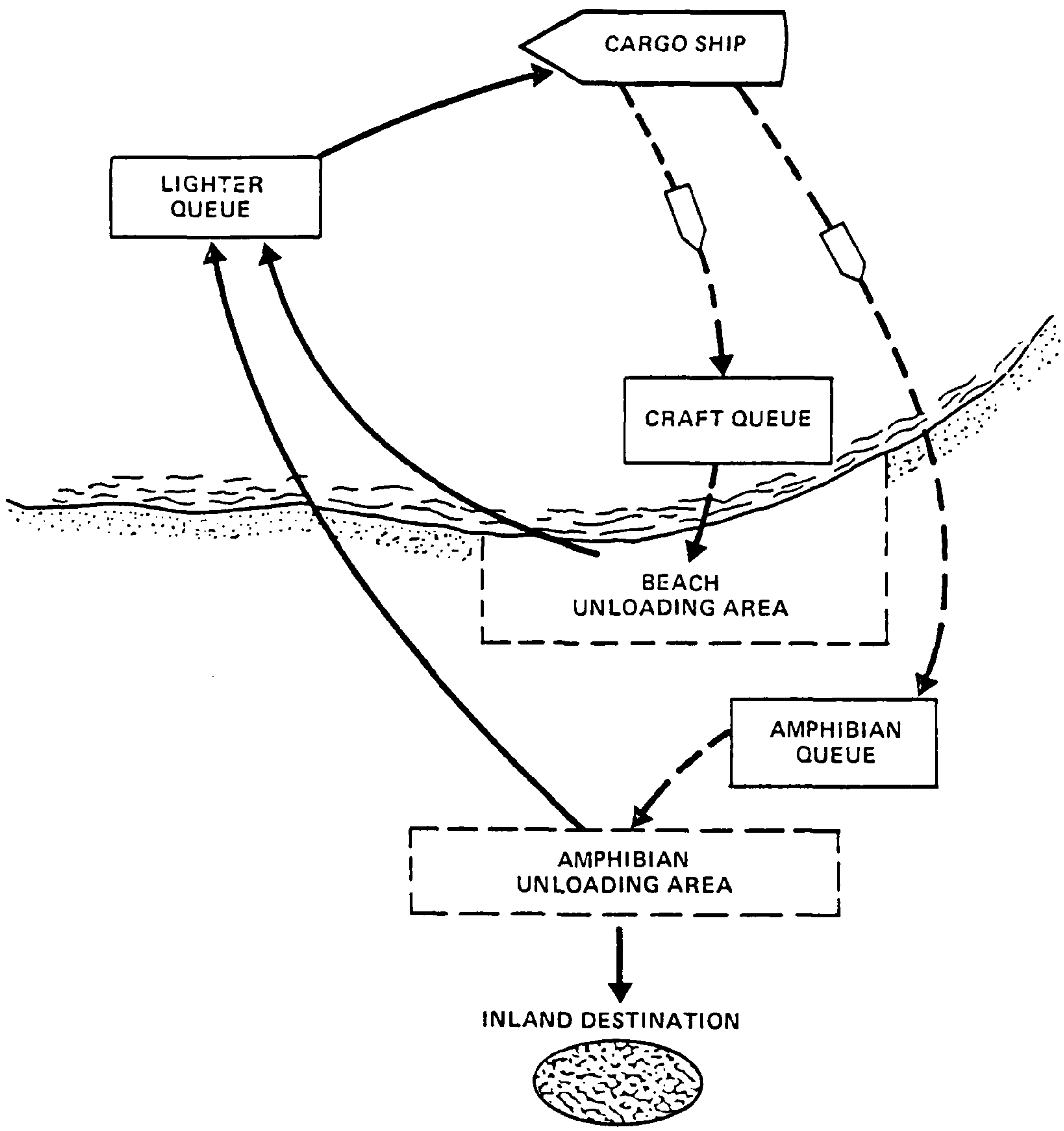

FIGURE 1. OPERATIONAL SEQUENCE OF LOTS MODEL

For analyses the principal model outputs are the total time for unloading cargo, moving cargo ashore to a marshaling area, and resource productivity. A minimum time for unloading results when the system is in balance. This is dependent upon the input selections. That is, when the ship unloading rate is specified and sufficient transportation and handling assets are available at all times, the minimum time for moving the cargo ashore is the time for all the cargo to be discharged from the ship plus the time it takes the last piece of cargo to move from the ship to the marshaling area. If there is any time spent waiting for lighters or access to equipment such as the beach crane, the total time increases. Thus, the model usually is used starting with too few assets, particularly transportation assets, which results in a greater than minimum time. Then in succeeding runs the assets are augmented until a minimum time is achieved. Except for additional ship cranes any further increase in assets, of course, could not reduce this minimum time.

The model is an expected value model that makes straightforward calculations based upon fixed values input by the analyst.

II. MODEL DESCRIPTION

The model provides a basic operational framework which is described in this section. Specifics for the selected LOTS system elements are entered in the input data. These inputs include the characteristics of the LOTS equipment, ship types, cargo, and performance parameters. Types of input data are described in the next section and the outputs are described in the last section.

OPERATION OF THE MODEL

Lighter Use

As the simulation begins, lighters are selected from a lighter holding point, or queue[1] located near the ship. The queue can have a mix of lighters. Lighter selection is based on priorities defined in the input data. The queue discipline is such that lighters with the highest priority (and later the highest priority and the most utilization) are called first. This assures that previously unused lighters are called from the queue only when needed and thus allows unused and marginal lighters to be identified. When a lighter is selected, it proceeds to the ship and moors. It is then ready for the loading process to being. If no lighters are available, the ship crane(s) waits. After each item is loaded on the lighter, the lighter record of time, weight, and volume is incremented and the ship load is decremented.

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[1] The holding points for lighters in the model are called queues. They are not, however, the result of variability in serving rates, such as the waiting lines investigated in queuing theory.

For each lighter two capacity measures are used while loading containers. The first is the number of containers the lighter has space for and the other is its maximum weight capacity. Neither capacity can be exceeded. For general cargo, weight, and volume capacities are used in the same way as containers. An exception is vehicle cargo for which weight and square feet of floor space are used. No cargo can be stowed on top of vehicles.

When the lighter is full, it travels to one of two possible queues near the shore. Landing craft travel to a queue located just off the shore, and amphibians go to a queue on land. Both types of lighters remain in their queue until an unloading space becomes available. After arriving at an unloading point, the lighter is off-loaded. The model keeps track of the cargo that was initially loaded on the lighter. This cargo is off-loaded one item at a time. The record of lighter time is incremented and the cargo remaining on board the lighter is decremented. The record of cargo on shore is correspondingly increased. The empty lighter returns to the queue near the ship.

Ship Unloading

In the ship unloading subsystem, there is provision for five ship types: non-self-sustaining containership, breakbulk general cargo ship, self-sustaining containership, roll-on-roll-off (RO/RO) ship, and a lighter-aboard ship (LASH) ship. In the LOTS main test two ships were employed: a non-self-sustaining containership, and a breakbulk ship. The way the LOTS model simulates the unloading of these two ship types is described in the following paragraphs.

Non-Self-Sustaining Containership. In the model the non-self-sustaining containership is divided into cargo hatches and each hatch is sub-divided into container cells. Each cell has several levels with a container at each level. The number of hatches, cells, and the levels within each cell are specified in the inputs. Only the containers in the uppermost level of each cell are accessible to the crane.

Each container has a specified weight. If a lighter has the deck space to carry another container but the next container in the cell being unloaded exceeds the weight capacity of the lighter, then a sequential search is conducted of the containers in the cells in the same hatch (and specified in the input as accessible). If a container within the weight capacity of the

lighter is found, it is loaded aboard the lighter. In the event all accessible containers in the hatch are too heavy, the lighter casts off and proceeds to shore.

Two types of cranes are simulated for the unloading of a non-self-sustaining containership: the crane-on-deck and the barge-temporary container discharge facility (barge-TCDF). In the model the cranes are specified by their container transfer rate, number of hatches discharged from one location, time to reposition the crane, and times to remove and replace hatch covers.

Average container transfer times are inputs to the model. Several values of these container transfer times can be specified for any one run of the model. In this way the time to transfer a container to a lighter can be specified for each lighter type and container weight.

Breakbulk Ship. In the model a general cargo ship is also separated into cargo hatches. Each cargo hatch has decks. The decks are numbered sequentially and must be unloaded in order, with the uppermost deck unloaded first. All cargo must be removed from the uppermost loaded deck before any cargo from the next lower deck can be removed.

In the input each item of cargo on a deck is assigned an access number which is made to correspond to an area on the cargo decks. Each such access number can be applied to a mix of cargo. The cargo in the center of the hatch is assigned the lowest access number and the access numbers increase as the distance from the center of the hatch increases. The cargo with the lowest access number is extracted first. This corresponds to removing the cargo first from the square of the hatch. There is no change in cargo unloading rate with access number.

Selection of cargo to be unloaded is based not only on the lowest access number still containing cargo but also on the amount of cargo capacity left in the lighter. If a craft is partially loaded and each of the items of cargo at the lowest access level exceeds the remaining capacity of the lighter, then the cargo at the second lowest access number is checked. In the event all the cargo within the two lowest access number areas exceeds the remaining capacity of the lighter, the lighter casts off and proceeds to shore.

A regular and a heavy-lift boom are modeled. The quantity, locations and capacities of the booms are specified in the input data. The heavy-lift boom on a typical cargo ship has a 60-long ton capacity and the regular cargo booms have a 15-long ton capacity. On the general cargo ship modeled the heavy-lift boom serves both cargo hatches two and three. The time to rerig the heavy-lift boom from hatch to hatch is an input.

The times to remove hatch covers on the weather deck and the hatch covers between decks are inputs. Each type of cargo has a transfer time associated with it which may differ for each type of lighter.

The model provides for simultaneously working all hatches on a general cargo ship. Each hatch can be discharged to lighters on both sides of the ship. When off-loading a hatch to both sides of the ship, unloading times were increased 20 percent over the crane cycle time used in discharging to only one side, again specified as part of the input.

An important calculation in the model concerns the location of lighters along the side of a general cargo ship. Some lighters are longer than a cargo hatch. The number of hatches blocked by each lighter type is in the input data. When a lighter is full and casts off, a calculation is made to determine the space available to moor the next lighter. If the lighters in the queue waiting to be loaded exceed the length of space at the ship, the space remains unoccupied.

There are two ways for a new lighter to be assigned to the unoccupied hatch. First, a lighter leaves an adjoining hatch and this provides the required length of space for a lighter in the queue to moor. The other way is for a shorter lighter to arrive. A lighter occupying two hatches receives cargo from both hatches.

<u>Shore Cargo Transfer Operations</u>

A lighter travels from the ship to one of the two shoreside queues. Landing craft go to a queue just off the beach and amphibians to an inland queue. Each lighter waits its turn in the queue until a crane or other material handling equipment is available to unload it. Of course, a lighter arrives at an unloading site with the same cargo that was loaded on it at the ship.

At a lighter unloading site, cargo is removed one item at a time. The time to transfer each item to a truck or the ground is specified in the input data for each type of lighter unloading site, by craft and cargo type. When applicable, the time to moor and unmoor (dock and undock) a craft at an unloading site is also part of the input data. Again, these input times can vary for the different combinations of craft, cargo and unloading sites.

SHIP ARRIVALS

Each ship has a fixed number of hatch slots and a fixed number of cargo hatches. Each hatch slot is assigned one and only one cargo hatch from which it may receive cargo. On the other hand, a single cargo hatch may supply cargo to more than one hatch slot; e.g., a general cargo ship hatch can discharge cargo over both sides of the ship.

Ships are ready to moor craft as soon as they arrive (proper booms rigged, etc.). Craft, if any are available, have been chosen for assignment to hatch slots by the time the ship arrives. Mooring can begin immediately upon ship arrival.

With the exception of a LASH and ships moored at a transfer facility with a causeway, one ship's queue is established to service all ships. Each ship is the same distance from the queue. Each ship is the same distance from shore.

The off-loading of a LASH is not explicitly modeled; since tugs do not interact with the other craft types. A barge arrival at the shore is modeled instead. The arrival of a barge from a LASH is input data and the barge arrival time equals the actual LASH arrival time plus the time required to move the first barge from the LASH to a "sea wall" load/unload site at the beach.

CRAFT-HATCH SLOT SELECTION

If a hatch slot is designated "open" (i.e., hatch slot is ready to off-load cargo) and if a craft meeting the rules of compatability is in the ship's queue, then the craft may be assigned or sent to the hatch slot for loading. If the craft is assigned to a hatch slot as soon as the craft arrives in the ship's queue, then travel time from the ship's queue to the ship must

be added. If the craft is assigned after it has been waiting in the ship's queue, travel time from the queue is not added. The rationale for this assumption is that, if the craft is waiting in the queue, it has enough advance notice to move to the hatch slot before (1) the previous craft departs, (2) the hatch slot arrives (ship arrival), or (3) a new boom type is rigged at the hatch slot.

Each cargo hatch at all times has a mix of cargo (a subset of all the cargo in the hatch) that is immediately available or most accessible for unloading. The mix is updated as cargo is unloaded. Craft selection is based on the highest priority cargo type in the mix. Thus, a hatch slot will remain idle rather than off-load to a craft that is not compatible with the highest priority cargo type in the mix, even though the craft may be compatible with a lower priority cargo type in the mix.

Every combination of craft type, cargo type, and hatch slot type is assigned a priority number which indicates the relative preference for loading with that combination of craft, cargo, and hatch slot. (Craft-cargo-hatch slot priority matrix.) Low priority numbers indicate highest preference. Priority numbers may be equal. Some combinations are incompatible so that loading cannot occur.

In this craft selection process, all "open" hatch slots are sorted in order of their priority for service. Hatch slots which have been left "open" for the longest time are given the highest priority. An exception to this rule occurs at hatch slots on opposite sides of a general cargo ship. In this case, two hatch slots receive cargo from the same cargo hatch. When both hatch slots are operating simultaneously, unloading times are increased 20 percent over the crane cycle time used in discharging to one side. Therefore, for maximum efficiency, the hatch slots on the far side of a general cargo ship are given a lower priority for service than all other "open" hatch slots in the system.

The ship's queue — containing craft ready to service a hatch slot — is operated on a "last come, first served" basis. More precisely, craft with lower ID numbers are chosen first, all else being equal. This discipline assures that a new craft will be called into operation only when an additional craft is required. Unused craft capability can be easily identified.

The factors listed above are considered in the craft selection process in the following manner:

- All combinations of the open hatch slots and the craft in the queue are searched for the lowest compatible craft-cargo-hatch slot priority number.
- If two or more craft-hatch slot combinations become possible at the same time and if two or more of the combinations have the same priority, then the hatch slot with the highest priority for service is chosen for craft assignment.
- If two or more combinations are equal in factors described above, then the craft with the lowest ID number is chosen.

Due to the configuration of hatch slots at a general cargo ship the craft selection process requires some additional limitations for assignment of a *multi-hatched craft* to a general cargo ship.

Multi-hatched craft are physically long enough so that, if one is moored at one general cargo ship hatch slot, one or more adjacent hatch slots may be blocked by the multi-hatched craft. Blocked slots cannot be used for off-loading. In the input data, adjacent hatch slots must be consecutively numbered.

Rules for multi-hatched craft assignment can apply only to craft at a general cargo ship. If the multi-hatched craft is to be assigned to a hatch slot at the end of a general cargo ship of another "end" type of hatch slot, then the rules for multi-hatched craft assignment do not apply since there is no adjacent hatch slot to one side of the assigned slot. If a multi-hatched craft which is capable of being loaded from more than one hatch slot is assigned to an end hatch slot, it will block the number of slots specified in its multi-hatch code, and load for "blocked" slot that are compatible.

If the craft to be assigned to a particular general cargo ship hatch slot is multi-hatched and both adjacent hatch slots are "occupied" (or

blocked) so that the craft cannot be moored, then both the craft and the hatch slot will be "saved" until one or both craft leave the adjacent slots allowing the saved craft to be moored. Depending on the length of the craft, it may "block" one or both of the adjacent slots.

SHIPSIDE LOADING ROUTINE

There are three different shipside loading routines to be described in separate sections:

- General cargo ship and RO/RO ship off-loading routine
- Self-sustaining containership off-loading routine
- Non-self-sustaining containership off-loading routine.

Cargo items are always moved directly from their original position in the cargo hatch to the craft. On helicopter platforms the container may have to wait for pickup. Items are never placed on the ship's deck to allow other items to be loaded first. This rule applies when ship transfer facilities (crane to off-load a non-self-sustaining containership) are in use as well. Cargo transfer time at shipside is independent of the location of the cargo item in the cargo hatch. Items on the lowermost decks (or cell-levels) of the ship take the same time as items from the upper deck. Cargo transfer time is a function of cargo type, craft type, and hatch slot type only.

Capacity of a craft for cargo is expressed as follows:

- Total weight of cargo that may be loaded. Each cargo item has a specific weight.
- Total volume of cargo that may be loaded. Each cargo item, excluding vehicles, has a specific volume.
- Total deck space capacity for vehicles. Vehicles have a specific floor area requirement. To find the volume required by a vehicle, the floor space is multiplied by the height of the craft cargo space. This assumption implies that cargo items will not be loaded on top of vehicle cargo.

- Number of items of each cargo type that may be loaded into the craft. The total number of cargo items of priority number less than or equal to the given cargo type must be less than or equal to the allowable number of items of the given cargo type.

- The craft is loaded item by item. When the next item to be loaded exceeds one of the four capacity measures loading is discontinued. Loading time is increased each time another item is loaded.

Selection of the next cargo item to be loaded depends on the following:

- Only the cargo that is immediately accessible in the cargo hatch is chosen. Most accessible mixes of cargo are chosen first among all the accessible cargo.

- When the mix of most accessible cargo has been chosen, the highest priority cargo type of this mix will be selected first for loading.

A craft always goes directly to the load/unload site queue when it leaves a hatch slot, even if the craft is only partially full (i.e., craft never move from one hatch slot to another). Mooring and unmooring times for a craft at shipside are a function only of hatch slot type and craft type. Mooring time includes mooring and approach time; it does not include travel time from the ship's queue. Unmooring time always equals 50 percent of mooring time. Loading cannot begin until mooring is completed. Location of cargo on a craft is not modeled. No time is required to redistribute cargo on a craft. The following assumptions apply to ships unloaded at a ship transfer facility with a causeway:

- A general cargo ship, RO/RO ship, or container ship may be moored at a ship transfer facility with a causeway.

- Except for self-deployable vehicles from a RO/RO ship, cargo must be loaded from a cargo hatch on the ship to a truck. Therefore, a truck is required for off-loading.

- The causeway for trucks is two-way and may accommodate more than one truck at a time. The system is never constrained due to the capacity of the causeway.

GENERAL CARGO SHIP AND RO/RO SHIP OFF-LOADING ROUTINE

Each general cargo ship cargo hatch may have one or two hatch slots that may discharge cargo. These hatch slots are on opposite sides of the ship. One of the two hatch slots at a double-rigged hatch has a lower priority for service than hatch slots at single-rigged hatches.

Each general cargo ship cargo hatch has one or more decks containing cargo. These decks are numbered sequentially and must be unloaded in that sequence. The uppermost deck is unloaded first. All cargo must be removed from a deck before any cargo from the next lower deck can be removed.

Each deck has one or more access numbers containing cargo. Each access number may contain a mix of cargo. Thus, each cargo item is located by specifying the cargo hatch, the deck, and the access number. The access number indicates the relative distance of cargo from the hatch. Selection of cargo for craft selection is based only on the mix of cargo at the lowest access number still containing cargo. In the loading routine, all cargo at the lowest access number is tried for loading first. The mix of cargo at the second lowest access number is tried if the craft has not been filled. However, the cargo at the third access cannot be tried until the first lowest access number has been emptied of cargo.

At a general cargo ship hatch slot, one of two booms types is used for loading cargo. The type of boom to be used is determined by the type of cargo that is being loaded. Each cargo type has associated with it a parameter which indicates which boom type must be used. Heavy cargo must use the heavy boom, while lighter cargo must use the light boom.

All cargo items requiring the heavy lift boom must be unloaded first. This assures that the time-consuming operation of re-rigging is performed only once. Thus, all heavy lift items must be located in the upper decks. In an actual general cargo ship, heavy lift cargo items are normally loaded

on the weather deck and in the "squares" of the cargo hatches within reach of the heavy lift boom. The square of the hatch at the next lower level will be used for heavy lift cargo only if all the heavy lift cargo won't fit in the squares of the hatch at the upper levels. For purposes of the model, the decks must be defined in sequential order so that all decks containing heavy lift cargo are given the lower numbers.

Every time a new deck is opened, the hatch covers for the new level must be opened. Thus, a delay time — "deck delay time" — is added before loading can continue.

On the standard general cargo ship, one heavy lift boom is shared by cargo hatches 2 and 3. The heavy lift boom transfers cargo from one cargo hatch to one hatch slot at a time. If cargo hatch 2 has heavy lift cargo, the heavy lift boom is initially rigged at cargo hatch 2, to move cargo at hatch slot 2. The hatch slot on the opposite side of the ship is closed. If cargo hatch 3 has any heavy lift cargo, both hatch slots at that hatch are also closed. If there are no heavy items at hatches 2 and 3 then light booms are initially rigged at both hatches.

As soon as all heavy lift cargo has been off-loaded from cargo hatch 2, the heavy lift boom is re-rigged from cargo hatch 2 to hatch 3 (if hatch 3 has heavy lift cargo) and the light boom is rigged in place of the heavy boom at slot 2. Each of the two rigging operations has a delay time associated with it. The hatch slot remains closed for this length of time to allow the rigging to be completed. Thus, delay times for the operation are specified in the input data.

The routines in the model are general, so that the same procedure can be followed for cargo hatches other than 2 and 3, if the other cargo hatches are defined to have a heavy lift boom.

All hatch slots at cargo hatches not containing heavy lift cargo are initially rigged with light booms.

If the proper boom type is not rigged at a hatch slot, the hatch slot is closed. No craft are assigned to the slot until the proper boom

type has been completely rigged. Thus, mooring of a craft and rigging of the boom cannot be performed concurrently at the same hatch slot.

When one cargo hatch is being off-loaded to two hatch slots, the times of each slot increase by 20 percent. In this model, the first craft arriving at a cargo hatch with two hatch slots will be assumed to operate at 100 percent efficiency. If a second craft arrives at the hatch slot on the opposite side of the ship before the first craft leaves, this second craft will have its entire load time increased by 20 percent. If a third craft arrives at the first slot, before the second craft leaves, the load time of the third craft will also be adjusted.

Multi-hatched craft which are simultaneously loaded at two or more hatch slots may be assigned to general cargo ships. If the craft is not assigned to an end hatch slot and if one or more slots adjacent to the assigned slot are "occupied" and can be unloaded, then loading will occur at two or three hatch slots. The craft selection process optimizes craft selection only at the assigned hatch slot. The multi-hatch loading situation is handled as follows:

If N is the number of hatch slots which can simultaneously be off-loaded to a given craft, then each cargo hatch will load 1/Nth of the craft. The loading process is performed N times, and the longest of the N loading times is used as the overall loading time for the craft.

A RO/RO ship has a loading operation similar to a general cargo ship with the following differences:

- A RO/RO ship carries only vehicle cargo. A "deck delay time" is not added when cargo is taken from a new deck.
- The ship has one cargo hatch and one hatch slot of the RO/RO type. Vehicles are driven or towed from the ship into an appropriate craft moored at the RO/RO slot.
- No booms are used for off-loading so there are no special considerations given to heavy lift cargo.

Mixes of vehicles, self-deployable (SD) or non-self-deployable (NSD) and general cargo are not allowed on a craft, unless the craft can be simultaneously loaded from more than one hatch.

SELF-SUSTAINING CONTAINERSHIP OFF-LOADING ROUTINE

A self-sustaining (SS) containership is divided into two "cargo hatches" — one forward and one aft. Each cargo hatch contains approximately one-half of the cells. Containers in the forward cargo hatch can be transferred only to a forward hatch slot, while containers in the aft hatch are moved only to the aft hatch slot.

Each containership cargo hatch has a set of cells containing containers. The cells are numbered in sequence. Each cell has several levels with one container at each level. Only the container at the uppermost filled level can be removed. The cells are unloaded in order of their sequence numbers. Thus, containers are removed from one cell at a time starting with the uppermost in cell number one. If a container exceeds the remaining capacity of the craft (based on craft weight capacity) or if the cell is empty, then the uppermost container in the next cell is tried.

A SS containership has three hatch slots (two lighterage slots and one helicopter platform).

Hatch slots 2 and 3 do not interfere with hatch slot 1. Lighters are assigned to slot 1 and loaded with the gantry crane using the container selection process described above.

The gantry crane at cargo hatch 2 is used to move containers to lighters at hatch slot 2, as well as to the helicopter platform at hatch slot 3. Thus, interference occurs when both lighterage and helicopter are operating at cargo hatch 2. The helicopter platform is always kept "ready for pickup." Whenever there is no container on the platform and the departing helicopter is sufficiently far away (e.g., "unmooring" time has elapsed since pickup); the gantry will move a new container to the platform. Thus, if lighterage is being loaded at slot 2, the gantry must be taken away for use at slot 3.

The cycle of operation at the helicopter platform consists of the following:

- Helicopter approach (mooring),
- Helicopter pickup of container (loading),
- Helicopter departure (unmooring),
- Movement of a new container to the helicopter platform (crane cycle).

At the ship arrival time it is assumed that a container has already been moved to the platform. When there is a plenitude of helicopters, the helicopter loading rate is limited by the gantry cycle time.

Since a container may be placed on the helicopter platform before a helicopter has been selected, the rules for selecting a container for loading must be modified for the helicopter platform. If a container cannot be lifted by the helicopter type with the largest lift capability, then the container will not be moved to the platform.

Containers are not lifted directly from the cells by helicopters at an SS containership.

NON-SELF-SUSTAINING CONTAINERSHIP

A non-self-sustaining (NSS) containership is conceptually divided into cargo hatches. Containers in a given cargo hatch can be moved only to a hatch slot corresponding to the cargo hatch.

Each cargo hatch has one lighterage hatch slot and one helicopter hatch slot from which containers are lifted directly from the cells.

The lighterage hatch slots are served by a ship transfer facility. Ship transfer facility is a general term defined as any sort of NSS containership discharge facility. Any type of facility may be used as long as the methodology of its operation is in accordance with the following constraints:

a. The facility is not modeled as a temporary storage site/ helicopter pick-up point. It is only a platform to support a crane.

b. One crane is on each facility.

c. The crane will not stop operations for helicopters.

Since the ship transfer facility has only one crane, only one lighterage hatch slot is in use at a time. Off-loading begins at hatch slot 1. When slot 1 is emptied, the ship is warped (delay time), and off-loading of slot 2 begins. The operation proceeds until the ship is emptied.

Selection of containers at a ship transfer facility hatch slot is the same as at a lighterage hatch slot on a SS containership.

At the helicopter hatch slots, containers are lifted directly from the cells. Helicopters cannot operate too close to the gantry. There should always be a 25 percent safety space between helicopter and gantry operations as the ship is warped. In the model the "cargo hatch" at which the helicopter is operating must be at least two cargo hatches away from the "cargo hatch" where a crane is operating.

OFF-LOADING OF BARGES FROM A LASH

As soon as the first barge arrives, a barge may be assigned to each unoccupied "sea wall" lighter unloading site (LUS). Off-loading can begin as soon as "set-up" is completed. If there is more than one sea wall initially available, then an additional delay equal to the barge discharge time must be added before unloading can begin at the next sea wall LUS.

As soon as one barge is unloaded and shutdown time added, the next barge is moored at the sea wall. This assumption implies that the tugs can deliver barges from the LASH faster than the barges can be unloaded.

Cargo may be off-loaded from a barge in any convenient order -- i.e., individual cargo locations on a barge are not modeled. A barge is unloaded in the same way as a craft.

Sea wall LUSs are used only for barges whenever a barge is waiting to be unloaded.

SHORE FACILITIES

A craft can only be unloaded at a lighter unloading site (LUS). There are a number of different types of LUSs; they may be located at the beach, amphibian discharge point (ISS), or the marshaling yard. Each LUS must be specified in the input data. An LUS can service only one craft at a time.

MHE is generally required to discharge cargo from a craft. The following situations may occur with respect to MHE:

- The LUS has its own fixed MHE (e.g., a crane)
- No MHE is required (e.g., helicopters, discharge of self-deployable vehicles from some craft types).
- Mobile MHE assigned to the LUS from MHE pool. There are three MHE pools; one at the beach, one at the ISS, and one at the marshaling yard.

When trucks are not available to unload craft at the LUSs, cargo may in some cases be left at a temporary holding area (THA) near the LUS. There are two temporary storage areas:

- THA -- located at the beach, and
- ISS -- located at the ISS LUSs.

There are three LUS queuing areas for craft to wait for assignment to an LUS. These queuing areas are near the beach, the ISS, and the marshaling yard. When a craft leaves a hatch slot it is sent to the nearest queuing area that corresponds to an LUS type that may service the craft; theoretically an amphibian craft could be assigned to a marshaling yard LUS or to an ISS LUS, but in this case it is sent to the ISS queuing area because it is closer.

There is a two-way road system running between the beach, ISS, and marshaling yard. The system is never constrained due to the capacity (in terms of weight or volume of traffic) of the roads.

Cargo is moved from the beach and ISS to the marshaling yard using trucks. The queuing area for the empty trucks is between the beach and the ISS. It is assumed that delays due to trucks traveling from the queue to an LUS or the THA or ISS will never occur.

Maintenance and refueling of trucks and MHE are not modeled.

CRAFT ASSIGNMENT TO LUS

Each craft type/cargo type combination has a list, in preferential order, of all LUS and MHE types that can be used to unload the craft. The list is called the LUS-MHE priority matrix and is defined in the basic input data.

The three LUS queuing areas are lumped together to determine the priority for service of craft in the LUS queue. Other factors being equal, the LUS queue operates on a "first come, first served" basis.

A number of conditions must be satisfied for a craft to be assigned to an LUS. They are as follows:

- If the LUS-MHE priority matrix indicates that a certain type of mobile MHE is required, then this MHE must be available in the nearest MHE pool.
- An LUS of the required type must be available and not occupied by another craft.
- "Heavy" cargo items, non-self-deployable vehicles, and containers may never be left at the THA or the ISS (except when left by

helicopters). Since these items must be taken directly to the depot, a truck must be available to service a craft containing these types of cargo.

- Both the THA and ISS have a limit to the tonnage of cargo that can be stored. If this limit is exceeded, a craft cannot be assigned to an LUS unless a truck is available to prevent further overflow of the storage areas.
- Barges (carried in a LASH) can only be off-loaded at a sea wall. Thus, when a LASH is in the system, sea walls will be reserved for barges. Therefore, when a LASH is present, a craft can be sent to a sea wall only if it is a first priority assignment.

All craft satisfying the above requirements are candidates for an LUS assignment. The selection process is as follows:

- LUS-MHE priority. All craft with the lowest LUS-MHE priority number are selected first. Only the highest priority cargo type on the craft is considered for LUS and MHE selection.
- When the LUS-MHE priority is equal, craft are assigned in order of arrival at LUS queue (earliest arrival first).

A craft remains in the LUS queue until all requirements for off-loading of the highest priority cargo type have been met. When all requirements have been met and MHE and trucks assigned (if appropriate), then the craft leaves the LUS queue for the LUS. Travel time to the LUS and "LUS set-up time" (function of LUS type and craft type--similar to mooring time) are added before off-loading can begin. Thus, there can be a substantial delay between the departure of one craft and the beginning of unloading of the next craft at the same LUS, depending on the input data.

CRAFT OFF-LOADING

A craft is entirely unloaded at one LUS. It never moves from one LUS to another. MHE are assigned only for the highest priority cargo type aboard the arriving craft. All cargo is handled by the assigned MHE provided it is compatible with all the cargo on the craft. In case of cargo-assigned MHE incompatibility, a new MHE is assigned from the pool to finish the unloading of the craft. Craft may have to wait for MHE in such cases. Another potential

cause of delay occurs when a craft carries more cargo than one truck can accommodate and the craft must await the assignment of an additional truck.

Any LUS can service only one truck at a time. Unloading of a craft is item by item. Positions of cargo items in the craft are not modeled, so that all cargo items are assumed to be equally accessible for unloading.

Craft off-loading is of one of the following modes:

- Off-loading at the marshaling area--All cargo compatible with the current mobile MHE is unloaded in order of cargo type priority. If a cargo type is incompatible with the MHE, then a cargo type of lower priority is unloaded first. MHE is then reassigned to unload the cargo that was incompatible with the previous type of MHE. The craft waits if compatible MHE is unavailable.
- Craft-Truck off-loading--loading proceeds as above except that loading is discontinued when the truck is filled. At this time the truck departs and the truck queue is searched for another truck. If a truck is found, it is assigned and the process is repeated. If no truck is found, loading continues in the "craft-ground" mode.
- Craft-ground off-loading--One item of the highest priority cargo type, compatible with current mobile MHE, is transferred from the craft to the appropriate temporary storage area. Next, the truck queue is searched. If no truck is found, another item is unloaded as the process is repeated. When a truck is found, craft-truck loading begins. Helicopters never unload to trucks and generally carry one item; so their only off-loading mode is craft-ground.
- Off-loading of self-deployable (SD) vehicles--SD vehicles are never put in a truck. Thus, whenever an SD vehicle cargo type is reached and a compatible mobile MHE type is available, all SD vehicles of the current type are off-loaded. The SD vehicles then move in a convoy to the depot.

Choice of MHE type is not dependent on mode of off-loading. It depends only on cargo type and craft type. Thus, craft-truck cargo transfer uses the same MHE as craft-ground transfer.

Mobile MHE is assigned one "unit" at a time. There is never more than one MHE unit simultaneously at one LUS. One "unit" is usually one piece of equipment, although in the case of small forklifts one "unit" may be two or more forklifts. In addition to the "mobile MHE," additional MHE may be used.

A truck leaves an LUS when (a) the truck is full, (b) the craft is empty, or (c) MHE is changed (even if the truck is not full), whichever happens first.

TRUCK ASSIGNMENTS, TRAVEL, AND LOADING

Each cargo type has a list, in preferential order, of the truck types that may carry that type of cargo ("Truck Priority Matrix"). Two or more truck types may have the same priority number for one cargo type.

Trucks are used in several different places in several different situations. The situations requiring a truck are considered in the following order:

- Hatch slots on a ship at a ship transfer facility with a causeway requiring a truck for off-loading.
- Barges waiting at a sea wall requiring a truck. MHE must be available before a truck will be assigned.
- Craft waiting at an LUS.
- Craft waiting in the LUS queue. A new craft is assigned to an LUS. If required, trucks and MHE are available.
- Cargo stored at the beach THA. Cargo is investigated for truck assignments in order of cargo type priority. Trucks are assigned if MHE is available.

Determination of the particular truck to assign in each of the above situations is governed by the following rules:

- If two or more hatch slots, two or more barges, or two or more craft are waiting, the sequence of investigation is as follows:

- Hatch slots are investigated in order of their ID numbers.
- Barges are investigated in order of the ID numbers of the sea wall LUS at which they are moored.
- Craft waiting at an LUS are investigated in descending order of their ID numbers. Thus, the larger craft will have the first chance for truck assignment within this category of assignment.
- Craft in the LUS queue are investigated in order of their queue arrival time -- "first come, first served."

- Once a specific slot, barge, or craft has been found and the highest priority cargo type aboard has been determined, the type of truck in the truck's queue with the lowest truck-cargo priority number will be chosen.
- If more than one truck of the chosen type (or types) is in the queue, the truck with the most recent queue arrival is chosen ("last come first served" queue discipline).
- Thus, a given truck is not necessarily assigned to the optimum craft (a barge or hatch slot); but a given craft (or barge or hatch slot) is always assigned the optimum truck available at assignment time.

Trucks leaving an LUS or a THA go directly to the depot.

When trucks move to the THA or ISS to transfer cargo, they are not assigned to discrete slots. The number of trucks that can be simultaneously serviced is dependent only on available MHE.

If a unit of MHE can load or unload a cargo item from a truck, it can load or unload any cargo item of a lower priority cargo type (i.e., a "small" cargo type).

The MHE choice for trucks is based on highest priority cargo type and is derived from the "MHE Priority Matrix for Trucks." The MHE choice for loading trucks (at a storage area) is the same as for unloading.

The location of individual cargo items in a truck is not modeled. Truck capacities are handled in the same way as craft capacities, except that vehicle floor space is not considered.

Trucks have two speeds, loaded and unloaded. No time is allowed for acceleration, deceleration, traffic conditions, or set-up and shut-down of the unloading operation.

III. INPUTS AND OUTPUTS

INPUTS

The input data required has been broken into two categories - basic data, and run dependent data. Complete instructions for data preparation are in Appendix C.

Basic Data

Basic data relates to the performance of the system, the facts of the system. Ideally, the basic data will not change. A summary of the basic data follows.

Cargo Module Descriptions. This is the weight, volume, deck space, and type for each cargo module to be moved.

Craft Speeds and Capacities. Four speeds and four capacities for each craft type are possible.

Truck Speeds and Capacities. Two speeds and three capacities (weight, volume, number of items) for each truck type can be specified.

Mooring/Unmooring Times. Times for approach and mooring and for unmooring as a function of the hatch slot type and craft type are required.

Unloading Site Setup/Shutdown Times. Delay times at shoreside LUS are similar to mooring/unmooring times. Each time is a function of LUS type and craft type.

Cargo Transfer Times per Cargo Item. Different transfer times can be specified depending on the kind of transfer:

- Ship-Craft. Function of hatch slot type, craft type, cargo module,
- Craft-Truck. Function of craft type, cargo module, MHE type,
- Craft-Ground. Function of craft type, cargo module, MHE type,
- THA-Truck. Function of truck type, cargo module, MHE type, and
- Truck-Destination. Function of truck type, cargo module, MHE type.

Craft Priorities. Selection priorities for craft at shipside are a function of hatch slot type, craft type, most accessible cargo module in the cargo hatch.

Unloading Site Selection Priorities for Assigning Craft to an LUS Type. These are a function of craft type, LUS type, and the largest cargo module on the craft.

MHE Selection Priorities for Selection of MHE for a Craft at an LUS. Each combination of craft, LUS, and cargo module type has a list of MHE types associated with it.

Truck Selection Priorities. These are a function of truck type and cargo module. Each truck-cargo combination has an associated list of MHE types.

Run Dependent Data

Run dependent data consist of the variables of the system. These are the parameters to be varied from one run to the next in the parametric approach. Taken together the run dependent data constitutes a total description of the scenario within which a LOTS operation will be performed.

Work Load.

- Ship types and descriptions,
- Ships' arrival schedule, and
- Ships' loads - mix of cargo modules on each ship.

Craft Mix. Fleet of craft available to perform the mission. The fleet may be:

- A "pure mix" or a fleet consisting of only one type of craft, with a specified number of craft.
- A true mix of craft, with craft types and numbers specified.
- Either of the above, with craft of the indicated types available as needed. The model will demonstrate the number of craft utilized.

Distances. The following apply to distance input requirements:

- Ship-shore distance,
- Beach-destination distance, and
- Amphibian unloading area - destination distance.

Shoreside Facilities. The number of supporting resources available for the operation may be specified or the model may determine the number utilized.

- Lighter unloading sites. Types of LUS available at each of the three unloading areas,
- Mix of trucks,
- Mix of mobile MHE types available at each of the three MHE pools, and
- THA temporary holding area capacities. Capacity of each of the two temporary holding areas in tons of cargo.

OUTPUTS

There are two primary outputs of the LOTS model of most direct interest: the overall time required for a specified amount of cargo to be moved from aboard ship to a marshaling area; and tabulations of the percentages of the total assigned lighters, trucks, and MHE that were actually used. The first measure, the overall time required, is extended when insufficient assets are assigned so that one or more critical subsystems are idle part of the time. On the other hand, when more than enough transport assets are assigned (i.e., lighters and trucks), the time measure becomes a constant minimum and the second primary output becomes useful. This output shows what percentages of each of the assigned transport were actually used. The priority system used in the queues assures that already-used transport equipment is used first, so that statistics on assigned-but-not-used transport can readily be collected.

A set of summary statistics is printed at the end of each run. A table of statistics is given for the lighters, the trucks, the material handling equipment and the ships. The table for lighters gives the number of round trips from the ship to shore and the cargo carried. It also gives the time and percent of time spent in mooring and unmooring, loading and unloading, traveling to beach, traveling to ship, and the time spent in the queue at the shore and at the ship. The table for trucks is similar. A summary of material handling equipment utilization is also printed. The summary for the ships gives the time to off-load each hatch, total time to clear the ship, and all cargo to arrive at the marshaling area. In addition, the time the ship crane was idle, if any, is given.

APPENDIX A
PROGRAM DESCRIPTION

An event-sequenced simulation technique is utilized in the programming of the LOTS model. Each LOTS element (i.e., ship, lighter, truck) is observed only when it is involved in a specified event. When an event occurs, the appropriate element is processed and the time of the next event, if any, is determined. For example, when a lighter arrives at the ship, event one has occurred. The lighter moors and is loaded, and the time for event two, lighter leaves the ship, is determined. The model next observes the lighter when event two occurs. To determine the next event to be processed, the event clock is searched and the event with the minimum time is selected.

An executive routine (see Figure A.1) searches the event clock, determines the next event, and transfers to the subroutine which processes the event that was found. If no event is found, program control is transferred to a subroutine, which prints an output summary, and the run is complete. Each event is processed in a separate subroutine named EVENT1, EVENT2, . . ., EVENT19, and described in Table A.1. In addition, a number of utility subroutines are used by the event subroutines as shown in Table A.2. A description of the utility subroutines is in Table A.3. After an event has been processed, control returns to the executive routine and the event clock is again searched. A detailed flow

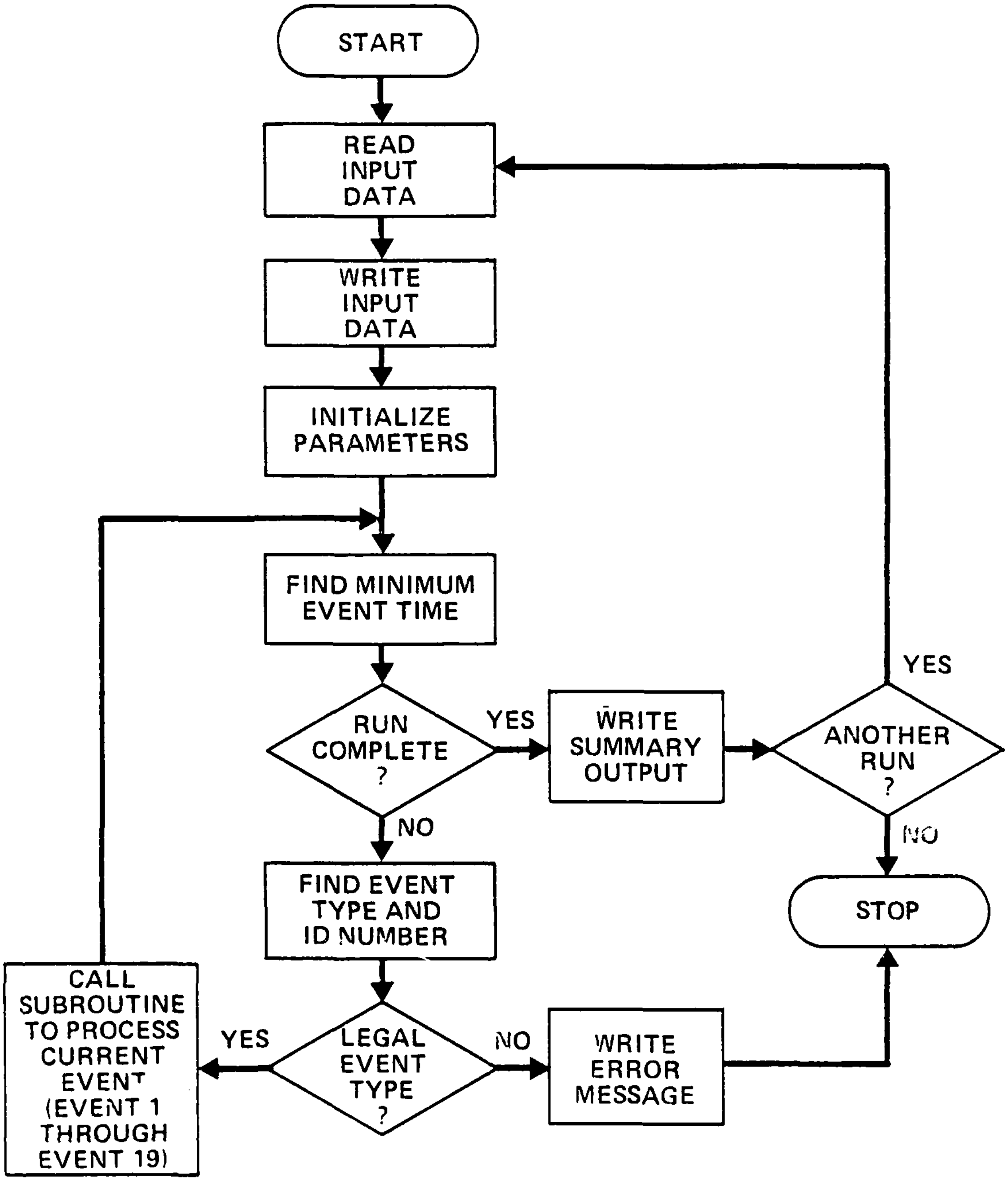

FIGURE A.1. EXECUTIVE ROUTINE LOGIC

TABLE A.1

SUMMARY DESCRIPTION OF EVENT SUBROUTINES

Subroutine	Summary Description
EVENT1	Lighter arrives at the ship
EVENT2	Lighter leaves the ship
EVENT3	Lighter arrives at the shoreside queue
EVENT4	Lighter arrives at the unloading site and unloading begins
EVENT5	Lighter unloading continues
EVENT6	Lighter leaves the unloading site and returns to queue at the ship
EVENT7	Truck leaves lighter unloading site
EVENT8	Truck arrives at the marshaling area
EVENT9	Truck leaves marshaling area
EVENT10	Fixed pier requires truck
EVENT11	Pier ready to discharge barge
EVENT12	Truck arrives at the shore queue
EVENT13	Self-deployable vehicle arrives at the marshaling area
EVENT14	Ship arrives
EVENT15	Lighter is required at the ship
EVENT16	Lighter remains at an unloading site for retrograde only
EVENT17	Fixed pier is ready for ship
EVENT18	Barge leaves pier
EVENT19	Lighter loading at the ship continues

TABLE A.2

UTILITY SUBROUTINES USED BY EVENT SUBROUTINES

Event Subroutines	Utility Subroutines
EVENT1	HSSORT, LDCONS, LDGCS, LOADEX
EVENT2	CRFDES, EVENT3, FNSSHS, HELPLT, HSSORT, MINCLK
EVENT3	TRKSEL
EVENT4	MINCLK
EVENT5	CLUSSL, EVENT4, TRKASG, TRKDES, TRKSEL, WATCRF, WATTRK
EVENT6	CLUSSL, MINCLK, SHPDEP, TRKASG, TRKDES, WATCRF, WATTRK
EVENT7	CLUSSL, TRKASG, TRKDES, WATCRF, WATTRK
EVENT8	TKUNLD
EVENT9	TRKASG, WATCRF, WATTRK
EVENT10	EVENT4, TRKASG, TRKDES, TRKSEL, WATCRF, WATTRK
EVENT11	EVENT4, TRKASG, TRKDES, TRKSEL, WATCRF, WATTRK
EVENT12	CLUSSL, TRKASG, WATCRF
EVENT13	MINCLK
EVENT14	HSSORT, MINCLK, SHPMOV
EVENT15	FNSSHS, HSSORT, MINCLK, SHPDEP
EVENT16	EVENT4, TRKASG, TRKDES, TRKSEL, WATCRF, WATTRK
EVENT17	CLUSSL, MINCLK, SHPDEP, TRKASG, TRKDES, WATCRF, WATTRK
EVENT18	CLUSSL, MINCLK, SHPDEP, TRKASG, TRKDES, WATCRF, WATTRK
EVENT19	HELPLT, HSSORT, LDCONS, MINCLK

TABLE A.3

SUMMARY DESCRIPTION OF UTILITY SUBROUTINES
USED BY EVENT SUBROUTINES

Subroutine	Summary Description
CLUSSL	Assigns waiting lighters in the shoreside queue to an unloading site.
CRFDES	Sends lighters from a ship to a shoreside queue.
FNSSHS	Opens a new hatch on a non-self-sustaining containership and closes empty hatches.
HELPLT	Places a container on the deck of a containership for helicopter pickup.
HSSORT	Sorts all unoccupied berths at the ship. A bookkeeping subroutine.
LDCONS	Loads a lighter at a containership.
LDGCS	Loads a lighter at a general cargo ship.
LOADEX	Supervises the loading of lighters at a ship; calls LDCONS or LDCGS.
MINCLK	Updates event clock. A bookkeeping subroutine.
SHPMOV	Assigns a temporary container discharge facility to a non-self-sustaining containership.
TRKASG	Assigns empty trucks for loading.
TRKDES	Sends trucks to the marshaling area.
TRKSEL	Selects the highest priority truck from the truck queue for a given cargo type.
TRUNLD	Unloads a truck at the marshaling area.
WATCRF	Assigns trucks or mobile material handling equipment to waiting lighters.
WATTRK	Assigns trucks waiting for unloading at the marshaling area.

chart of each subroutine is adequately documented in the basic LOTS Simulation Model Documentation report.[1]

Communication within the program is accomplished by means of 13 labeled common blocks. Each block generally contains the same category of variables, and a description of each common block is in Table A.4. Most variables in the common blocks are integers; therefore, INTEGER*2 specifications can be used when running the program on an IBM computer. The INTEGER*2 statements reduce the core requirement by 40k bytes, thereby permitting a quicker turn around time on computers that give the highest priority to the smallest programs.

[1] U.S. Army Combat Developments Command Systems Analysis Group, Logistics-Over-the-Shore (LOTS) Simulation Model Documentation, ACN 14310, SH Group Technical Report 11-72, U.S. Army Combat Developments Command, Ft. Eustis, Va., 1972.

TABLE A.4

DESCRIPTION OF LABELED COMMON

Labeled Common Number	Description
1	Event clocks
2	Cargo data
3	Lighter data
4	Truck data
5	Cargo hatch data
6	Number of elements (i.e., craft, trucks, ships) in system
7	LOTS system description data
8	Current location of cargo
9	Lighter selection data
10	Shipside unloading data
11	Status of ship unloading
12	Lighter unloading site data
13	Cumulative output statistics

APPENDIX B
COMMON BLOCK VARIABLE DEFINITIONS

COMMON BLOCK A01 - Event Clocks, logical unit assignments, and output options.

NCLOCK(I)	Event clock for each element, where I is the element number (craft, truck, hatch slot, etc.).
NEVTYP(I)	Event type associated with NCLOCK(I) for element I.
NOPEL(I)	Operating element number for element I.
NELEMT(I)	Number of elements in clock I.
NCODE(I)	Not used.
NCLKEL	Number of last element in truck clock (clock 2). NCLKEL also contains minimum event times in clocks 3, 4, and 5.
NLSTEL	Number of last element in the clock.
MTIME	Current minimum event time in seconds.
IEVTYP	Event type of current event.
IELEMT	Element number of current event.
IACTEL	ID number of current element (craft ID, truck ID, ship ID, hatch slot ID, or self-deployable vehicle event ID).
INTCUM	Interval in seconds of periodic output reports.

INTPER	Interval in seconds between checks for MHE requirements.
LPTIME	Clock time in seconds of last MHE requirement check.
LOTIME	Clock time in seconds of last periodic output report.
NPRINT	Assigns logical unit number to the output report which writes the input data and any error messages. If value is six, report is printed. If the value is two, report is suppressed.
NTAPE	Assigns logical unit to narrative message output report.
NTAPE1	Assigns logical unit to periodic output reports.
NTAPE2	Not used.
NTAPE3	Assigns logical unit to each craft loading at shipside output reports.
NCARD	Assigns logical unit for the reading of input data cards. Value is five.
ICOUT	User output option.

1 = Productivities printed with periodic report for each individual craft.

2 = Productivities printed at end of the run only for each individual craft.

3 = Productivities printed with each periodic report, accumulated for each craft type.

4 = Productivities printed at the end of the run only, accumulated for each craft type.

COMMON BLOCK A02 - Cargo data.

CARGWT(I) Weight in short tons (s/tons) of cargo module I.

CARGVT(I) Volume in cu ft of cargo module I for containers and general cargo and deck space for vehicles.

CARGCT(I) Category of module I.

If >0 SD vehicle speed in MPH

= 0 General cargo

= -1 Container

= -2 NSD vehicle.

NCARHL(I) Heavy lift status of module I.

If = 1 Heavy lift item. Item requires heavy lift boom at general cargo ship. Item cannot be left at a temporary holding area.

= 2 Container. Item cannot be left at a temporary holding area.

= 3 Regular item.

NCGTAG(I) Cargo tag of module I. Data for transfer times, craft priorities, LUS, MHE, and truck selection are chosen, according to the cargo tag of the module involved. Cargo tags are as follows:

= 1 Heavy lift. General cargo more than 10 s/tons.

= 2 Not used.

= 3 Heavy self-deployable (SD) vehicles more than 10 s/tons.

= 4 Heavy non-self-deployable (NSD) vehicles more than 10 s/tons.

= 5 Heavy containers more than 10 s/tons.

= 6 Light containers.

= 7 Light SD vehicles.

= 8 Light NSD vehicles.

= 9 General cargo more than 5 s/tons.

= 10 General cargo less than or equal 5 s/tons.

= 11 Not used.

= 12 Pallets.

= 13 Retrograde containers.

COMMON BLOCK A03 - Lighter data.

CRAFWT(I) Weight capacity of craft type I in short tons.

CRAFVL(I) Volume capacity in cubic feet of craft type I. For helicopters CRAFVL(I) is set to 999999.0.

CRAFSP(I,J) Speeds of craft type I.

If J = 1 speed unloaded on land in MPH.
J = 2 speed loaded on land in MPH.
J = 3 speed unloaded at sea in knots.
J = 4 speed loaded at sea in knots.

Note: Land speeds are zero for craft that cannot travel on land.

CRAFHT(I) Height in feet of cargo carrying compartment of craft type I. Height is used to convert a cargo item into a volume requirement for the craft receiving the item. Height for a helicopter craft is zero.

NCRAFM(I) Mode of craft type I. Modes are:

1 landing craft

2 semi-amphibian

3 true-amphibian

4 true air cushion vehicle

5 barge discharge lighter

6 helicopter

7 Not used

8 rigid sidewall air cushion vehicle.

MULHAT(I) Multi-hatch code for craft type I. MN is the code where:

- M is the number of hatch slots blocked or rendered unusable to other craft due to mooring of a craft at a general cargo ship.

- N is the number of hatches which can discharge cargo simultaneously to the craft.

NCCITM(I,J) Cargo carrying capacities of craft type I.

> 0 Number of items of cargo module J that craft type I can carry.

= 0 Craft type I can carry zero items of module J.

= -1 Weight, volume, and deck space capacities are used to determine the number of items craft type I can carry.

NFILE(I) The number of full containers that must be removed before loading of retrograde containers onto the craft can begin.

CRAFFS(I) Deck space capacity in square feet for craft type I. (NOTE: Deck space is only used for calculating the number of vehicles a craft will carry.)

COMMON BLOCK AC4 - Truck Data.

TRUKWT(I) Weight capacity in short tons of truck type I.

TRUKVL(I) Volume capacity in cubic feet of truck type I.

TRUKSP(I,J) Speeds in miles per hour of truck type I.

J = 1 Truck is empty.

J = 2 Truck is loaded or partially loaded.

NTCITM(I,J) Number of items of cargo module J that will fit into truck I.

> 0 Number of items of cargo module J that truck type I can carry.

$= 0$ Truck type I can carry zero items of module J.

$= -1$ Weight, volume, and deck space capacities are used to compute the number of items truck type I can carry.

NPRTRK(I,J) Truck priority matrix.

> 0 The priority number of truck type I for cargo type J.

$= 0$ Truck type I is incompatible with cargo type J.

NPRTCG(I) Highest priority cargo module currently on truck I.

MHEPRY(I,J,K) MHE priorities for trucks.

I is priority number.

J is truck type.

K is cargo tag.

(NOTE: If priority is zero, then no appropriate MHE types assignable. If the MHE type equals the number of mobile MHE types plus one, then no MHE are required.)

KPRCAR Current cargo module on truck. It is used by the truck selection routine (TRKSEL).

IPRTRK Priority of truck type selected by TRKSEL. Output of TRKSEL.

ITRUCK ID of truck selected by TRKSEL. If equals zero, no compatible truck is in the queue. Also, this is the ID of the truck currently under consideration in other subroutines.

NTRUKQ	Number of trucks currently waiting in the truck queue.
NTRKPR	Maximum number of compatible MHE priorities for trucks. Dimension of I subscript in MHEPRY.
MHETRK(I)	Mobile MHE type currently assigned to truck I. If MHETRK equals five, then no MHE is needed.
LDGTTM(I,J,K)	Ground-truck transfer times for truck k, MHE J, and cargo tag I.
LDTGTM(I,J,K)	Truck-ground transfer times for truck k, MHE J, and cargo tag I.

COMMON BLOCK A05 - Cargo Hatch Data.

NHSSHP(I)	Number of hatch slots at ship I.
NCHSHP(I)	Number of cargo hatches on ship I.
IDSHIP(I)	Ship type of ship I.
	= 1 General cargo ship.
	= 2 SS container ship.
	= 3 LASH ship.
	= 4 RO/RO ship.
	= 5 NSS containership.
NSHPHS(I)	ID of ship that contains hatch slot I.
IDHSLT(I)	Hatch slot type of hatch slot I.
NCHCOR(I)	ID of cargo hatch corresponding to hatch slot I.
LOCHS(I)	Location of hatch slot I.
	= 1 Near side of general cargo ship.
	= 2 Near side and end of general cargo ship.
	= 3 Far side of general cargo ship.
	= 4 Far side and end of general cargo ship.
	= 5 Causeway.
	= 6 LASH Barge Slot - LUS - Seawall only.
	= 7 Containership slot for lighters.
	= 8 SS containership slot for helicopters.
	= 9 NSS containership slot for helicopters.
NHATSS(I)	Hatch slot state of hatch slot I.
NSTYP(I)	Ship type associated with hatch slot type I.
NHATNO(I)	Number associated with NHATSS.
IDCARH(I)	Ship type holding cargo hatch I.

NSBOOM(I)	ID of cargo hatch sharing heavy lift boom with cargo hatch I, or the number of snatchable container levels at an NSS containership.
NSTIND(I)	First index number in hatch table for cargo hatch I.
ICHOR	Number of cargo hatch corresponding to hatch slot currently under consideration.
NSSSI(I)	ID of ship transfer facility currently at ship I.
NHATIX(I)	Number of cargo hatch containing cargo at index I in the hatch table.
NDCB(I)	"Deck-cell-Barge number" of cargo at index I.
NACCES(I)	Access number of cargo at index I.
NHTTAB(I,J)	Hatch table where: J is cargo module I is index number.
NTOTAL(I)	Total number of cargo items at index I.
LINDEX	Last index number in hatch table.

COMMON BLOCK A06 - Number of elements in the system.

NCRTYP(I)	Number of craft type I in the system.
NTKTYP(I)	Number of trucks of type I in the system.
NLSTYP(I)	Number of LUS of type I in the system.
NMHTYP(I,J)	Number of mobile MHE units of type I currently in MHE pool J. J = 1 is beach MHE pool. J = 2 is In-shore site MHE pool. J = 3 is depot MHE pool.
IDCRAF(I)	Craft type of craft I.
IDTRUK(I)	Truck type of truck I.
IDLUS(I)	LUS type of LUS I.
IDSDVH(I)	Cargo module of vehicles in SD vehicle event.
NCARTP	Number of cargo modules.
NCRFTP	Number of craft types.
NTRKTP	Number of truck types.
NLUSTP	Number of LUS types.
NMHETP	Number of mobile MHE types.
NHTSTP	Number of hatch slot types.
NCARHT	Number of cargo hatches.
NMHEPL	Number of MHE pools.
NLUS	Number of LUS in the system.
NTAGTP	Number of cargo tags.
NSI	Number of ship transfer facilities.

COMMON BLOCK A07 - LOTS system description.

DIST(I)	Distance in miles.	
	I = 1	Ship to beach queue.
	I = 2	Ship's queue to ship.
	I = 3	Beach queue to ship's queue.
	I = 4	Beach queue to beach.
	I = 5	Beach to ISS queue.
	I = 6	ISS to Depot queue.
	I = 7	ISS queue to ISS.
	I = 8	Depot queue to Depot.
	I = 9	Causeway to beach.
CAPST(I)	Capacity in short tons of storage I.	
	I = 1	is THA at the beach.
	I = 2	is THA at amphibian discharge point.
	I = 3	is destination.
ACAPST(I)	Short tons of cargo currently located at storage area I.	
LUSCRF(I)	ID of craft currently at LUS I.	
	< 0	ID of craft currently enroute to LUS I.
	= 0	No craft at or enroute to LUS.
	> 100	Barge number currently at seawall.
LUSTRK(I)	ID of truck currently at LUS I. If zero, no truck at LUS.	
LUSMHE(I)	Mobile MHE type currently at LUS I. If zero, no mobile MHE at LUS I.	
LUSLOC(I)	Location of LUS type I.	
	= 1	Beach.
	= 2	Amphibian transfer point.
	= 3	Destination.

LUSSTT(I) "MHE status" of LUS type I.

= 1 Seawall.

= 2 Fixed MHE.

= 3 Mobile MHE.

= 4 No MHE - helicopter pad.

= 5 Causeway.

LDCGTM(I,J,K) Craft-ground cargo transfer times in seconds for craft type K, cargo tag I, MHE type J.

LDCTTM(I,J,K) Craft-truck cargo transfer times in seconds for craft type K, cargo tag I, MHE type J.

COMMON BLOCK A08 - Current Location of Cargo.

LCRCAR(I,J)	Number of cargo items of module J currently on craft I.
LTKCAR(I,J)	Number of cargo items of module J currently on truck I.
LSTCAR(I,J)	Number of cargo items of module J currently at storage area I.

Storage area numbers are:

= 1 THA at the beach.

= 2 THA at the amphibian discharge point.

= 3 Destination.

COMMON BLOCK A09 - Lighter Selection Data.

LISTCR(I)	ID of craft I in craft selection list.
LISTHS(I)	Hatch slot selection list of I^{th} hatch slot in the list.
NSORT(I)	Temporary sorting list of clock element number which is I^{th} in list.
NPRCAR(I)	Highest priority cargo module currently at cargo hatch I.
NLISCR	Number of craft currently in LISTCR.
NLISHS	Number of hatch slots currently in LISTHS.
ISLOT	ID of hatch slot currently under consideration for craft assignment.
ICRAFT	ID of craft currently under consideration for assignment.
NPRCHC(I,J,K)	"Craft-Cargo-Hatch slot priority matrix" for cargo tag I, for hatch slot type J, and for craft type K.

COMMON BLOCK A10 - Shipside Unloading Data.

MOORTM(I,J)	Mooring time in seconds at shipside for craft type I at hatch slot J.
LOADTM(I,J,K)	Loading time in seconds at shipside for cargo tag K, craft J, and hatch slot I.
NBDT	Barge discharge time in seconds.
NDECKD	Deck delay time in seconds.
NRTM80	Time in seconds to flip heavy lift boom.
NRTM15	Time required to rerig from heavy lift boom to normal boom.
NSMT	Time to move an NSS container ship to a ship transfer facility.
NSIMT	Ship transfer facility mooring time in seconds.
NHELOD	Helicopter delay time in seconds.
NSIWT	Warp time in seconds.

COMMON BLOCK A11 - Status of Ship Unloading.

NCITEM(I)	Number of items of cargo module I allowed on craft currently under consideration.
ITIME	Current time in seconds in loading operation.
LDTIME	Time in seconds required for loading.
JSLOT	ID of hatch slot where loading is currently being performed.
JHATCH	ID of cargo hatch where loading is currently being performed.
WEIGHT	Weight of cargo that may be loaded from current hatch to current craft.
VOLUME	Volume of cargo that may be loaded from current hatch to current craft.
L1	First index number in current cargo hatch that contains cargo.
L3	Last index number in current cargo hatch.
CCWT	Current weight of cargo in craft.
CCVL	Current volume of cargo in craft.
INDEX	Index number of cargo currently being loaded.
NCONTR	Number of items currently in craft.
FLOOR	Deck space of vehicular cargo that may be loaded from current hatch to current craft.
CCFS	Current deck space used on craft.

COMMON BLOCK A12 - Lighter Unloading Site (LUS) Data.

LUSQUE(I)	ID of I^{th} craft in LUS queue.
NPRCCG(I)	Highest priority cargo module currently on craft I.
NPRLUS(I,J,K)	LUS type.
NPRMHE(I,J,K)	Mobile MHE type for cargo tage K, craft J, and priority I.
LUSLIS(I)	ID of first open LUS of type I. If equal zero then no open LUS of type I.
LUSSDT(I,J)	LUS shutdown time.
LUSBTM(I,J)	LUS setup time.
LUSCRQ	Number of craft in LUS queue.
NLUSPR	Maximum number of LUS-MHE priorities for any craft-cargo combination.
LUSOPN	Number of LUS that are currently open.

COMMON BLOCK A13 - Cumulative Output Statistics.

NCRCUM(I,J)	Cumulative craft statistics for craft ID I.	
	If J = 1	Number of cycles completed.
	= 2	Time in ship's queue.
	= 3	Travel-ship's queue to ship.
	= 4	Mooring.
	= 5	Loading.
	= 6	Unmooring.
	= 7	Travel-ship to LUS queue.
	= 8	Time in LUS queue.
	= 9	Travel-LUS queue to LUS.
	= 10	Setup time at LUS.
	= 11	Off-loading at LUS.
	= 12	Waiting for off-loading.
	= 13	Shutdown at LUS.
	= 14	Travel-LUS to ship's queue.
	= 15	Beach hold queue.
NTKCUM(I,J)	Cumulative truck statistics for truck ID number I.	
	If J = 1	Number of cycles completed.
	= 2	Time in truck queue.
	= 3	Loading at LUS.
	= 4	Waiting at LUS.
	= 5	Loading at THA/LUS.
	= 6	Travel loaded.
	= 7	Unloading.

= 8 Waiting for unloading.

= 9 Travel unloaded.

MHECYC(I,J,K) Number of times returned to pool J, MHE type I, and LUS if K = 1 or storage if K = 2.

MHECAR(I,J,K) Number of cargo items carried by MHE type I at pool J of cargo module K.

MHECUM(I,J,K) MHE time statistic at return to pool J for MHE type I and for

K = 1 Time at LUS.

= 2 Loading storage area.

= 3 Unloading storage area.

LUSUSE(I,J) LUS statistics for LUS I and craft type J.

LUSCUM(I,J) For LUS type I,

J = 1 Time occupied.

= 2 Time reserved.

NSTCUM(I,J) Not used.

NHSCUM(I,J) Hatch slot time statistic for hatch slot I where:

J = 1 Time closed.

= 2 Time open.

= 3 Time blocked.

= 4 Time occupied.

= 5 Time saved.

= 6 Time empty.

= 7 Time in system.

NHSCRF(I,J) Number of craft serviced of craft type (or truck type J) at hatch slot I.

NTRAFF(I) Not used.

NCRCAR(I,J) Total cumulative cargo of module J carried by craft I.

APPENDIX C

INPUT DATA FORMATS

BASIC DATA

Basic data is not changed during the execution of any given job. Several simulation runs may be made in one job using the same set of basic data. Basic data is printed in the same order that it is read. Different sets of run dependent data can be entered for each job. The data formats are described in this appendix in the same order as the data cards are read by the program.

LOGICAL UNIT OPTIONS

Rec	Format	Col.	Name	Description
1	I5	1-5	NTAPE	Assigns logical unit to narrative message output report
	I5	6-10	NTAPE1	Assigns logical unit to periodic reports output report
	I5	11-15	NTAPE2	Not used
	I5	16-20	NTAPE3	Assigns logical unit to each craft loading operation at shipside output report

(A value of 2 suppresses the output and a value of 6 writes the output.)

TITLE

Rec	Format	Col.	Name	Description
1	20A4	1-80	NALPHA(20)	Title of run for alphanumeric output only
2	20A4	1-80	NALPHA(20)	Title of run for alphanumeric output only

CARGO MODULES

Rec	Format	Col.	Name	Description
1	I8	1-8	NCARTP	Number of cargo modules

One record for each cargo module plus one record for empty container module (NCARTP + 1 records).

Rec	Format	Col.	Name	Description
2-N	4A4	1-16	NALPHA(4)	Module description (used for alpha-numeric output only)
	I7	18-24	I	Cargo module priority number
	F7.2	25-31	CARGWT(I)	Module weight
	F7.2	32-38	CARGUT(I)	Module volume
	F7.2	39-45	CARGCT(I)	Module category
	I7	46-52	NCARHL(I)	Module heavy lift category
	I7	53-59	NCGTAG(I)	Module tag

CARGO TAGS

Rec	Format	Col.	Name	Description
1	I8	1-8	NTAGTP	Number of cargo tags
One record for each cargo tage (NTAGTA records).				
2	I8	1-8	I	Cargo tag number
	17A4	13-80	NALPHA(17)	Cargo tag description

CRAFT TYPES

Rec	Format	Col.	Name	Description
1	I8	1-8	NCRFTP	Number of craft types

Three records for each craft type (3 X NCRFTP records).

Rec	Format	Col.	Name	Description
2	4A4	1-16	NALPHA(4)	Craft type description (used for alphanumeric output only)
	F7.2	18-24	CRAFWI(I)	Weight capacity (tons)
	F7.2	25-31	CRAFVL(I)	Volume capacity (cuft)
	F7.2	32-38	CRAFSP(I,1)	Craft speed empty, land (mph)
	F7.2	39-45	CRAFSP(I,2)	Craft speed loaded, land (mph)
	F7.2	46-52	CRAFSP(I,3)	Craft speed empty, sea (knots)
	F7.2	53-59	CRAFSP(I,4)	Craft speed loaded, sea (knots)
	F7.2	60-66	CRAFHT(I)	Craft cargo carrying height (ft)
	I7	67-73	NCRAFM(I)	Craft mode
	I7	74-80	MULHAT(I)	Multi-hatch code
3	J(I2)	I-2J	NCCITM(I,J)	Craft cargo carrying capacity (I is craft number, J = 1 to NCARTP + 1.)
4	I8	1-8	NFILE(I)	Containers/file
	F8.2	9-16	CRAFFS(I)	Craft deck space (sq ft)

TRUCK TYPES

Rec	Format	Col.	Name	Description
1	I8	I-8	NTRKTP	Number of truck types

Two records for each truck type (2 X NTRKTP records)

Rec	Format	Col.	Name	Description
2	4A4	1-16	NALPHA(4)	Truck type description (used for alphanumeric output only)
	F7.2	18-24	TRUKWT(I)	Weight capacity (tons)
	F7.2	25-31	TRUKVL(I)	Volume capacity (cu ft)
	F7.2	32-38	TRUKSP(I,1)	Truck speed empty (mph)
	F7.2	39-45	TRUKSP(I,2)	Truck speed loaded (mph)
3	J(I2)	1-2J	NTCITM(I,J)	Truck cargo carring capacity (I is the truck number, J = 1 to NCARTP + 1)

LIGHTER UNLOADING SITE (LUS) TYPES

Rec	Format	Col.	Name	Description
1	I8	I-8	NLUSTP	Number of LUS types

One record for each LUS type (NLUSTP records)

Rec	Format	Col.	Name	Description
2	4A4	1-16	NALPHA(4)	LUS type description
	I7	18-24	I	LUS type number
	I7	25-31	LUSLOC(I)	LUS location
	I7	32-38	LUSSTT	LUS MHE status

MHE TYPES

Rec	Format	Col.	Name	Description
1	I8	1-8	NMHETP	Number of Mobile MHE types
	I8	9-16	NMHEPL	Number of Mobile MHE pools

One record for each MHE type plus three additional records (NMHETP + 3 records). The last three records are:

NMHETP + 1	Sea wall crane
NMHETP + 2	Semi-mobile crane
NMHETP + 3	not used

Rec	Format	Col.	Name	Description
2	4A4	1-16	NALPHA(4)	MHE type description (used for alphanumeric output only)
	I7	18-24	I	MHE type number

HATCH SLOT TYPES

Rec	Format	Col.	Name	Description
1	I8	1-8	NHTSTP	Number of hatch slot types

One record for each hatch slot type (NHTSTP records).

Rec	Format	Col.	Name	Description
2	4A4	1-16	NALPHA(4)	Hatch slot description (used for alphanumeric output only).
	I7	18-24	I	Hatch slot type number
	I7	25-31	NSTYP(I)	Ship type

MOORING TIMES

One record for each craft type

Rec	Format	Col.	Name	Description
1	J(F6.2)	1-6J	MOORTM(J,I)	Mooring times (min) (J = 1, NHTSTP) (I = hatch slot types)

LOADING DELAY TIMES

Rec	Format	Col.	Name	Description
1	F8.2	1-8	NDBT	Barge discharge time (min)
	F8.2	9-16	NDECKD	Deck delay time (min)
	F8.2	17-24	NRTM80	Heavy boom rig time (min)
	F8.2	25-32	NRTM15	Light boom rig time (min)
	F8.2	33-40	NSMT	Ship move time (min)
	F8.2	41-48	NSIMT	Ship facility mooring time (min)
	F8.2	49-56	NHELOD	Helicopter platform delay time (min)
	F8.2	57-64	NSIWT	Ship facility relocation time (min)

SHIP-CRAFT CARGO TRANSFER TIMES

One record for each craft type and cargo tag.

Rec	Format	Col.	Name	Description
1	N(F6.2)	1-N6	LOADTM(N,I,J)	Loading time for a cargo module (mins) (N is hatch slot type) (I is craft type) (J is cargo tag)

LIGHTER UNLOADING SITE SET-UP TIMES

One record for each craft type plus one additional record (NCRFTP+1 records). The last record is for barges.

Rec	Format	Col.	Name	Description
1	N(F6.2)	1-6N	LUSTBM(I,N)	LUS set-up time (mins) (I is craft type) (N is LUS type)

LIGHTER UNLOADING SITE SHUT-DOWN TIMES

One record for each craft type plus one additional record (NCRFTP+1 records). The last record is for barges.

Rec	Format	Col.	Name	Description
1	N(F6.2)	1-N	LUSSDT(I,N)	LUS shut-down time (mins) (I is craft type) (N is LUS type)

CRAFT-TRUCK CARGO TRANSFER TIMES

One record for each craft type and cargo tag.

Rec	Format	Col.	Name	Description
1	N(F6.2)	1-6N	LDCTTM(J,N,I)	Time to transfer a cargo (mins) module from craft to truck (J is cargo tag) (N is MHE type; N=1 to NMHETP+3) (I is craft type)

Incompatible times are indicated by a -1.00.

CRAFT-GROUND CARGO TRANSFER TIMES

One record for each craft type and cargo tag.

Rec	Format	Col.	Name	Description
1	N(F6.2)	1-6N	LDCGTM(J,N,I)	Time to transfer a cargo module from craft to ground (mins) (J is cargo tag) (N is MHE type; N=1 to NMHETP+3) (I is craft type)

GROUND-TRUCK CARGO TRANSFER TIMES

One record for each truck type and each cargo tag.

Rec	Format	Col.	Name	Description
1	N(F6.2)	1-6N	LDGTTM(J,N,I)	Time to transfer a cargo module from the ground to a truck (mins) (J is cargo tag) (N is MHE type; N=1 to NMHETP+1) (I is truck type)

TRUCK-GROUND CARGO TRANSFER TIMES

One record for each truck type and each cargo tag.

Rec	Format	Col.	Name	Description
1	N(F6.2)	1-6N	LDTTGM(J,N,I)	Time to transfer a cargo module from a truck to the ground (mins) (J is cargo tag) (N is MHE type; N=1 to NMHETP+1) (I is truck type)

CRAFT-CARGO-HATCH SLOT PRIORITY MATRIX

One card for each craft type and for each hatch slot type.

Rec	Format	Col.	Name	Description
1	N(I5)	1-N5	NPRCHC(I,J,N)	Craft selection priority (I is craft type) (J is hatch slot type) (N is cargo tag)

LUS-MHE PRIORITY MATRIX

Rec	Format	Col.	Name	Description
1	I8	I-8	NLUSPR	Number of LUS-MHE choices (priorities) for any given craft and cargo

Two records for each craft type and each priority.

Rec	Format	Col.	Name	Description
2	N(I5)	I-N5	NPRLUS(J,I,N)	LUS priority for a given craft type and cargo tag (J is LUS type) (I is craft type) (N is cargo tag)
3	N(I5)	I-N5	NPRMHE(J,I,N)	Mobile MHE, if any, used with a given LUS type, craft type, and cargo tag. (J is LUS type) (I is craft type) (N is cargo tag)

TRUCK PRIORITY MATRIX

One record for each truck type.

Rec	Format	Col.	Name	Description
1	N(I5)	I-N5	NPRTRK(I,N)	Priority of each truck type for each cargo tag (I is truck type) (N is cargo tag)

MHE PRIORITY MATRIX FOR TRUCKS

Rec	Format	Col.	Name	Description
1	I8	I-8	NTRKPK	Number of MHE choices (priorities) for any given truck and cargo tag

One record for each priority number and each truck type.

Rec	Format	Col.	Name	Description
2	N(I5)	I-N5	MHEPRY(J,I,N)	MHE priority for each truck type and cargo tag (J is priority number) (I is truck type) (N is cargo tag)

NUMBER OF RUNS FOR THIS JOB

Rec	Format	Col.	Name	Description
1	I1	1	NUMDS	Number of runs for current job

RUN DEPENDENT DATA

Run dependent data is printed in the same order that it is read. The following describes run dependent data for a simulation run.

CRAFT IN SYSTEM

One record for each craft type.

Rec	Format	Col.	Name	Description
1	I8	I-8	I	Craft type
	I8	9-16	NCRTYP(I)	Number of craft type I available to perform the operation

TRUCKS IN SYSTEMS

One record for each truck type.

Rec	Format	Col.	Name	Description
1	I8	1-8	I	Truck type
	I8	9-16	NTRKTYP(I)	Number of truck type I available to perform the operation

LUS IN THE SYSTEM

One card for each LUS type.

Rec	Format	Col.	Name	Description
1	I8	I-8	I	LUS type
	I8	9-16	NLSTYP(I)	Number of LUS type I available to perform the operation

MOBILE MHE IN THE SYSTEM

One record for each mobile MHE type.

Rec	Format	Col.	Name	Description
1	I8	I-8	I	Mobile MHE type
	3(I8)	9-32	NMHTYP(I,J)	Number of mobile MHE of type I in pool J (J=1 is beach pool) (J=2 is amphibian pool) (J=3 is destination pool)

SHIPS IN THE SYSTEM

Rec	Format	Col.	Name	Description
1	I8	1-8	NELEMT(3)	Number of ships in the system to be unloaded

One record for each ship.

Rec	Format	Col.	Name	Description
2	4A4	1-16	NALPHA(4)	Ship description (used for alpha numeric output only)
	I7	18-24	IDSHIP(I)	Ship type of ship I
	I7	25-31	NHSSHP(I)	Number of hatch slots in ship I
	I7	32-38	NCHSHP(I)	Number of cargo hatches on ship I
	I7	39-45	NCLOCK(NCLKEL+1)	Arrival time of ship I. At least one ship must have an arrival time of zero.

HATCH SLOT DATA

One card for each hatch slot.

Rec	Format	Col.	Name	Description
1	I8	1-8	I	Hatch slot number
	I8	9-16	IDHSLT(I)	Hatch slot type of hatch slot I
	I8	17-24	NSHPHS(I)	Number of ship with hatch slot I
	I8	25-32	NCHOR(I)	Number of cargo hatch used by hatch slot I
	I8	33-40	LOCHS(I)	Hatch location (see common A05)

HATCH TABLES

First record for each cargo hatch.

Rec	Format	Col.	Name	Description
1	I8	1-8	IDCARH	Cargo hatch type of hatch I
	I8	9-16	NSBOOM(I)	ID of cargo hatch sharing heavy lift boom with cargo hatch I or the number of snatchable container levels on a NSS containership

Two records for each cargo hatch.

Rec	Format	Col.	Name	Description
2	I3	1-3	NHATIX(INDEX)	Cargo hatch number
	I3	4-6	NDCB(INDEX)	"Deck-Cell-Barge" number
	I3	7-9	NACCES(INDEX)	Access number of general cargo
	I3	10-12	N	End signal for index in this cargo hatch. Equals -1 is last index number in this cargo hatch. Not equal -1 means more index
	22I3	13-79	NHTTAB(INDEX,J)	Cargo module number (22 modules)
3	18I3	1-54	NHTTAB(INDEX,J)	Additional cargo modules

NUMBER OF SHIP TRANSFER FACILITIES IN THE SYSTEM

Rec	Format	Col.	Name	Description
1	I8	1-8	NSI	Number of ship facilities in the system

DISTANCES

All distances are in miles

Rec	Format	Col.	Name	Description
1	F8.2	1-8	DIST(1)	Ship to beach queue distance
	F8.2	9-16	DIST(2)	Ship's queue to ship distance
	F8.2	17-24	DIST(3)	Beach queue to ship's queue distance
	F8.2	25-32	DIST(4)	Beach queue to beach distance
	F8.2	33-40	DIST(5)	Beach to amphibian unloading area queue
	F8.2	41-48	DIST(6)	Amphibian unloading area to destination queue
	F8.2	49-56	DIST(7)	Amphibian area queue to amphibian area
	F8.2	57-64	DIST(8)	Destination queue to destination
	F8.2	65-72	DIST(9)	Causeway to beach

TEMPORARY HOLDING AREA (THA) CAPACITIES

Rec	Format	Col.	Name	Description
1	F8.2	1-8	CAPST(1)	Capacity in tons of cargo at the THA at the beach
	F8.2	9-16	CAPST(2)	Capacity in tons of cargo at the THA at the amphibian unloading area

TIME INTERVALS

Rec	Format	Col.	Name	Description
1	F8.2	1-8	INTCUM	Time interval between cumulative statistical output reports
	F8.2	9-16	INTPER	Time interval between checks of MHE pools for estimated MHE requirements

OUTPUT CHOICE

Rec	Format	Col.	Name	Description
1	I8	I-8	ICOUT	User output option 1 = productivities printed with periodic report for each individual craft 2 = Productivities printed at end of the run only for each individual craft 3 = Productivities printed with each periodic report, accumulated for each craft type 4 = Productivities printed at end of run only, accumulated for each craft type

APPENDIX D
SIZE LIMITATIONS

The size of the data arrays are limited by the size of the dimension specifications in COMMON. The following steps should be taken to change the array specifications:

1. Change the appropriate dimension specifications in all COMMONS.

2. Format changes may be needed for input/output, especially in RPDATA, RSDATA, WCLOCK, and CUMOUT.

3. The upper limit of the first DO statement in START must be changed. This DO loop initializes all statistical arrays in common to zero. The upper limit must equal the number of variables in COMMON A13.

The dimension specifications are currently set to the following values:

100	Elements = # craft + # trucks + # ships + # hatch slots + # simultaneous self-deployable vehicle events + 1
40	Cargo modules (39 user-defined cargo modules plus one for empty containers)
13	Cargo tags

10	Craft types (9 user-defined craft types plus one for LASH barges)
10	Truck types
10	MHE priorities for trucks
15	MHE types (12 user-defined mobile MHE types plus three non-mobile)
30	Craft
30	Trucks
30	LUS
5	Ships
20	Hatch slots
20	Cargo hatches
100	Index numbers in hatch tables
10	Hatch slot types
5	Ship transfer facilities
15	LUS-MHE priorities

APPENDIX E
JOB CONTROL STATEMENTS

The job control language (JCL) statements to catalogue a private library on a disk pack, to compile and to execute the LOTS program are given in Figures E.1, E.2, E.3 and E.4.

```
//JOB CARD
/*SETUP          TIME=1     CORE=150 TAPES=0    DISK=1     REPLY=YES
/*SETUP          EXTID=D170      INIT=ORIATC  UNIT=D  DISP=OLD
//STEP1  EXEC  PGM=IEFBR14
//DD1  DD  DSN=JLOTS.OBJLIB,DISP=(NEW,CATLG),UNIT=3330,
// DCB=(RECFM=U,BLKSIZE=13030),
//  SPACE=(CYL,(25,5,25)),VOL=SER=ORIATC
/*
/*EOF
```

FIGURE E.1. JCL TO CATALOGUE A PRIVATE LIBRARY ON A DISK PACK

```
//JOB CARD
/*SETUP          TIME=1     CORE=150 TAPES=1    DISK=1     REPLY=YES
/*SETUP          EXTID=D170      INIT=ORIATC  UNIT=D  DISP=OLD
//JOBLIB   DD   DSN=JLOTS.OBJLIB,DISP=OLD
//FGCOMP   EXEC   FORTGCL,
//         PARM.FORT=SOURCE,
//         PARM.LKED=NCAL
//FORT.SYSIN   DD   *
  SOURCE DECK
/*
//LKED.SYSLMOD   DD   DSN=JLOTS.OBJLIB(LOTSONE),DISP=SHR
//LKED.SYSIN   DD   *
/*
/*EOF
```

FIGURE E.2. JCL TO COMPILE AND TO STORE THE OBJECT CODE OF THE FIRST ROUTINE

```
//JOB CARD
/*SETUP         TIME=      CORE=150 TAPES=      DISK=1      REPLY=Y S
/*SETUP         EXTID=D170      INITL=CRIATR  UNIT=D  DISP=OLD
//JOBLIB  DD  DSN=JLOTS.OBJLIB.DISP=OLD
//FBCOMP  EXEC  FORTGCL.
//        PARM.FORT=SOURCE
//FORT.SYSPRINT  DD  SYSOUT=A
//FORT.SYSIN  DD  *
  SOURCE DECK
/*
//LKED.SYSLMOD  DD DSN=*.JOBLIB.DISP=SHR
//LKED.SYSPRINT  DD  SYSOUT=A
//LKED.SYSAD  DD  DSN=*.JOBLIB.DISP=SHR
//LKED.SYSIN  DD  *
  INCLUDE SYSAD(LOTSONE)
  ENTRY MAIN
  NAME LOTSONE(R)
/*
/*EOF
```

FIGURE E.3. JCL TO COMPILE AND TO STORE THE OBJECT CODE OF ALL ROUTINES EXCEPT THE FIRST. (COMPILED ROUTINES CAN BE CHANGED AND COMPILED AGAIN. THE NEW OBJE~~ REPLACES THE OLD OBJECT CODE. MORE THAN O~~ ~~UTINE MAY BE COMPILED SIMULTANEOUSLY.)

```
//JOB CARD
/*SETUP         TIME=C     CORE=300 TAPES=      DISK=      REPLY=Y S
/*SETUP         EXTID=D170      INITL=CRIATR  UNIT=D  DISP=OLD
//JOBLIB  DD  DSN=JLOTS.OBJLIB.DISP=OLD
//RUN  EXEC  PGM=LOTSONE.TIME=2
//GO.FT02F001  DD  DUMMY
//GO.FT05F001  DD  *
  INPUT DATA DECK
/*
//GO.FT06F001  DD  SYSOUT=A,
//  DCB=(RECFM=FA,LRECL=133,BLKSIZE=665)
/*EOF
```

FIGURE E.4. JCL TO EXECUTE THE PROGRAM

APPENDIX F
PROGRAM LISTING

This appendix contains the LOTS Simulation Model which is listed first. The main program is followed by various appropriate subroutines. Subroutines are listed in alphabetical order.

```
C     MAIN PROGRAM
C
C*****
C
C
C*****
      COMMON/ADI/NCLOCK(100),NEVTYP(100),NOPEL(100),NELEMT(6),NCODE(20),
     .            NCLKEL,NLSTEL,MTIME,IEVTYP,IELEMT,IACTEL,INTCUM,INTPER,
     .LPTIME,LOTIME,NPRINT,NTAPE,NCARD,NTAPE1,NTAPE2,ICOUT,NTAPE3
      INTEGER*2NEVTYP,        NOPEL ,        NELEMT,        NCODE         A1
      NPRINT=6
      NCARD=5
      READ (NCARD,950) NTAPE,NTAPE1,NTAPE2,NTAPE3
  950 FORMAT (4I5)
C
C     READ DATA ROUTINE - READ ALL PERMANENT AND SCENARIO DATA.
C
      CALL RPDATA
      READ (NCARD,3300) NUMDS
 3300 FORMAT (I1)
      DO 3333 J=1,NUMDS
      CALL RSDATA
C
C     STARTUP ROUTINE - INITIALIZE BOOKKEEPING VARIABLES, PLACE CRAFT
C     AND TRUCKS INITIALLY IN QUEUES.
C     INITIALIZE EVENT CLOCKS.
C
      CALL START
      NEVENT=0
      LPTIME=0
      LOTIME=0
      MTIME=0
C
C               TEST CUMULATIVE OUTPUT TIME
    1 LETIME=MTIME
      IF((LOTIME+INTCUM).GT.MTIME) GO TO 3
C
      LOTIME=LOTIME+INTCUM
      CALL WCLOCK
      CALL CUMOUT(LETIME)
    2 IF((LOTIME+INTCUM).GT.MTIME) GOTO 7
      LOTIME=LOTIME+INTCUM
      GO TO 2
C
C               TEST PERIODIC OUTPUT TIME
C
    3 IF((LPTIME+INTPER).GT.MTIME) GO TO 7
    4 LPTIME=LPTIME+INTPER
      CALL PEROUT
      GOTO 3
C
C     SEARCH CLOCK FOR MINIMUM EVENT TIME.
C
    7 IELEMT=1
      MTIME= NCLOCK(1)
      DO 5 I=2,NCLKEL
```



```
      IF((MTIME.GT.0).AND.((NCLOCK(I).LT.0).OR.(NCLOCK(I).GE.MTIME)))
     .GO TO 5
      MTIME=NCLOCK(I)
      IELEMT= I
    5 CONTINUE
C
C     TEST FOR END OF SIMULATION RUN -- NO MORE EVENTS HAVE BEEN GENERATED.
C
      IF(MTIME.LT.0) GO TO 3000
      IF(IELEMT.NE.NCLKEL) GO TO 6
      IELEMT=NOPEL(NCLKEL)
      IACTEL=NEVTYP(NCLKEL)
      GO TO 9
C
C     MINIMUM TIME IS FOUND. FIND NEXT EVENT TYPE, ELEMENT TYPE AND
C     ADJUSTED ELEMENT NUMBER.
C
    6 IACTEL=IELEMT
      IF(IELEMT.GT.NELEMT(1))IACTEL=IELEMT-NELEMT(1)
    9 IEVTYP=NEVTYP(IELEMT)
C
C     ADJUSTED (ACTUAL) ELEMENT IS FOUND.
C     TEST FOR VALID EVENT TYPE.
C
      IF(IEVTYP.GT.0) GO TO 50
C
C     EVENT TYPE IS NON-PROCESSABLE, AND IS INVALID AS A MINIMUM EVENT
C     TYPE.
C
      OTIME=NCLOCK(IELEMT)/3600.
      WRITE(NPRINT,12) IEVTYP,IELEMT,OTIME
   12 FORMAT(1X,10HEVENT TYPE,I4,44H CANNOT BE PROCESSED.  OCCURS AT ELE
     .MENT NO.,I5,14H AT EVENT TIME,F7.2)
C
C     WRITE EVENT CLOCK FOR DEBUGGING.
C
      CALL WCLOCK
      STOP
C
C     NEXT EVENT TYPE IS FOUND. BRANCH FOR PROCESSING ACCORDING TO EVENT
C     TYPE.
C
   50 NEVENT=NEVENT+1
      OTIME=MTIME/3600.
      WRITE(NTAPE ,51)
      WRITE(NTAPE ,52)NEVENT,IEVTYP,IELEMT,IACTEL,OTIME,MTIME
   51 FORMAT(1X,120(1H*))
   52 FORMAT(1X,12HEVENT NUMBER,I6,6H  TYPE,I3,13H  ELEMENT NO.,I4,11H
     .ID NUMBER,          I3,7H  TIME=,F7.2,9H HOURS  (,I8,9H SECONDS))
      GO TO (100,200,300,400,500,600,700,800,900,1000,1100,1200,1300,
     .1400,1500,1600,1700,1800,1900),IEVTYP
C
C     EACH EVENT TYPE HAS A SUBROUTINE TO PERFORM THE APPROPRIATE
C     PROCESSING.
C
C     EVENT 1: CRAFT ARRIVES AT SHIP'S QUEUE.
```

```
C
  100 CALL EVENT1
      GO TO 1
C
C     EVENT 2: CRAFT LEAVES HATCH SLOT.
C
  200 CALL EVENT2
      GO TO 1
C
C     EVENT 3: CRAFT ARRIVES AT LUS QUEUE.
C
  300 CALL EVENT3
      GO TO 1
C
C     EVENT 4: CRAFT ARRIVES AT LUS.
C
  400 CALL EVENT4
      GO TO 1
C
C     EVENT 5: CRAFT LEFT AT LUS.
C
  500 CALL EVENT5
      GO TO 1
C
C     EVENT 6: CRAFT LEAVES LUS.
C
  600 CALL EVENT6
      GO TO 1
C
C     EVENT 7: TRUCK (LOADED) LEAVES THA/ISS.
C
  700 CALL EVENT7
      GO TO 1
C
C     EVENT 8: TRUCK (LOADED) ARRIVES AT ISS/DEPOT.
C
  800 IMHETP=0
      IMHEPL=0
      ITRK=0
      CALL EVENT8(IMHETP,IMHEPL,ITRK)
      GO TO 1
C
C     EVENT9: TRUCK (UNLOADED) LEAVES ISS/DEPOT.
C
  900 CALL EVENT9
      GO TO 1
C
C     EVENT 10: HATCH SLOT LEFT AT CAUSEWAY.
C
 1000 CALL EVNT10
      GO TO 1
C
C     EVENT 11: SEA WALL READY TO OFF-LOAD BARGE.
C
 1100 CALL EVNT11
      GO TO 1
```



```
C
C     EVENT 12: TRUCK ARRIVES AT TRUCK QUEUE.
C
 1200 CALL EVNT12
      GO TO 1
C
C     EVENT 13: SP VEHICLES ARRIVE AT DEPOT.
C
 1300 CALL EVNT13
      GO TO 1
C
C     EVENT 14: SHIP ARRIVAL.
C
 1400 CALL EVNT14
      GO TO 1
C
C     EVENT 15: HATCH SLOT OPENS.
C
 1500 CALL EVNT15
      GO TO 1
C
C     EVENT 16- CRAFT LEFT FOR RETROGRADE ONLY.
C
 1600 CALL EVNT16
      GO TO 1
C
C             EVENT 17- HATCH SLOT AT CAUSEWAY IS EMPTY.
C
 1700 CALL EVNT17
      GOTO 1
C
C             EVENT 18- BARGE LEAVES SEA WALL.
C
 1800 CALL EVNT18
      GOTO 1
C
C             EVENT 19- CRAFT LEFT AT HATCH SLOT.
C
 1900 CALL EVNT19
      GOTO 1
C
C     END OF SIMULATION -- MINIMUM EVENT TIME IS LESS THAN ZERO, ALL
C     EVENTS HAVE BEEN PROCESSED.
C     WRITE OUTPUT SUMMARY.
C
C
 3000 CALL SUMMRY(LFTIME)
 3333 CONTINUE
      STOP
      END
```

```
      SUBROUTINE CHFDES
C
C           CRAFT DESTINATION--SENDS CRAFT FROM HATCH SLOT TO
C           APPROPRIATE LUS QUEUING AREA.
C
C*****
C
      COMMON/A01/NCLOCK(100),NEVTYP(100),NOPEL(100),NELEMT(6),NCODE(26),
     .            NELKEL,NLSTEL,MTIME,IEVTYP,IELEMT,IACTEL,INTCUM,INTPER,
     .LPTIME,LCTIME,NPRINT,NTAPE,NCARD,NTAPE1,NTAPE2,ICOUT,NTAPE3
C
      COMMON/A02/CARGWT(40),CARGVL(40),CARCCT(40),NCARHL(40),NCGTAG(40)
C
      COMMON/A03/CRAFWT(10),CRAFVL(10),CRAFSP(10,4),CRAFHT(10),NCRAFM(10
     .),MULHAT(10),NCCITM(10,40),NFILE(10),CRAFFS(10)
C
      COMMON/A06/NCRTYP(10),NTKTYP(10),NLSTYP(15),NMHTYP(15,3),IDCRAF(30
     .),IDTRUK(30),IDLUS(30),IDSDVH(20),
     .            NCARTP,NCHETP,NTRKTP,NLUSTP,NMHETP,NHTSTP,NCARHT,NMHEPL
     .,NLUS,NSI,NTAGTP
C
      COMMON/A07/DIST( 9),CAPST(3),ACAPST(3),LUSCRF(30),LUSTRK(30),LUSMH
     .E(30),LUSLOC(15),LUSSTT(15),LDCGTM(13,15,10),LDCTTM(13,15,10)
C
      COMMON/A08/LCRCAR(30,40),LTKCAR(30,40),LSTCAR(3,40)
C
      COMMON/A12/LUSQUE(30),NPPCCG(30),NPRLUS(15,10,13),NPRMHE(15,10,13)
     .,LUSLIS(16),LUSBTM(10,15),LUSSDT(10,15),
     .            LUSCRG,NLUSPR,LUSOPN
C
      COMMON/A13/NCRCUM(30,15),NTKCUM(30,9),MHECYC(15,3,2),MHECAR(15,3,
     .40),MHECUM(15,3, 4),LUSUSE(30,10),LUSCUM(30,2),NSTCUM(2,40),NHSCUM
     .(20,7),NHSCKF(20,10),NTRAFF(2),NCRCAR(30,40),INDCYC(30,2),KSTAT(30
     .,4,2),CSTAT(30,4,3)
     .,MHEREQ(15,3),MHETOT(15,3)
C*****
      INTEGER*2NEVTYP,      NOPEL ,       NELEMT,       NCODE        A1
      INTEGER*2NCARHL,      NCGTAG                                   A2
      INTEGER*2NCRAFM,      MULHAT,       NCCITM,       NFILE        A3
      INTEGER*2NCRTYP,      NTKTYP,       NLSTYP,       NMHTYP       A6
      INTEGER*2IDCRAF,      IDTRUK,       IDLUS ,       IDSDVH       A6
      INTEGER*2LUSCRF,      LUSTRK,       LUSMHE,       LUSLOC       A7
      INTEGER*2LUSSTT,      LDCGTM,       LDCTTM                     A7
      INTEGER*2LCRCAR,      LTKCAR,       LSTCAR                     A8
      INTEGER*2LUSQUE,      NPRCCG,       NPRLUS,       NPRMHE       A12
      INTEGER*2LUSLIS,      LUSBTM,       LUSSDT                     A12
C
C           FIND HIGHEST PRIORITY CARGO TYPE ON CRAFT.
C
      ISLOT=NOPEL(IELEMT)
      DO 20 I=1,NCARTP
      IF(LCRCAR(IELEMT,I).NE.0) GOTO 30
   20 CONTINUE
      OTIME=MTIME/3600.
      WRITE(NPRINT,25) IELEMT,ISLOT,OTIME
   25 FORMAT(1X,30HOPERATIONAL ERROR--EMPTY CRAFT,I4,13H  LEAVES SLOT,I4
```


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```
     .,4H  AT,F8.2,31H  HOURS.  SENT TO SHIP-S QUEUE.)
      NEVTYP(IELEMT)=1
      NOPEL(IELEMT)=0
      CALL NCLOCK
      LLTIME=MTIME
      CALL CUMOUT(LLTIME)
      STOP
C
C           SET HIGHEST PRIORITY CARGO TYPE.
C
   30 ICARTP=I
      ITAGTP=NCGTAG(ICARTP)
      NPRCCG(IELEMT)=ICARTP
C
C           SEARCH LUS PRIORITIES FOR NEAREST LUS TYPE.
C
      ICRTYP=IDCRAF(IELEMT)
      ITEMP=3
      DO 50 I=1,NLUSPR
      ISUP=NPRLUS(I,ICRTYP,ITAGTP)
      IF(ISUB.EQ.0) GOTO 51
      IF(NLSTYP(ISUB).EQ.0) GOTO 50
      IF(LUSLOC(ISUP).GE.ITEMP) GOTO 50
      ITEMP=LUSLOC(ISUB)
   50 CONTINUE
C
C           SEND CRAFT TO LUS QUEUE.
C
   51 NEVTYP(IELEMT)= 4
      NOPEL(IELEMT)=ITEMP
C
C           FIND TRAVEL TIME TO QUEUE.
C
      LTIME=((3600.*DIST(1))/(1.1515*CRAFSP(ICRTYP,4)))+.5
      GOTO (200,100,80),ITEMP
C
C           TIME FROM ISS QUEUE--DEPOT QUEUE.
C
   80 LTIME=LTIME+(3600.*(DIST(7)+DIST(6)))/(CRAFSP(ICRTYP,2)) +.5
C
C           TIME FROM BEACH QUEUE--ISS QUEUE.
C
  100 LTIME=LTIME+((3600.*DIST(4))/(1.1515*CRAFSP(ICRTYP,4)))+.5
      LTIME=LTIME+((3600.*DIST(5))/(CRAFSP(ICRTYP,2)))+.5
  200 OTIME=LTIME/3600.
      NCRCUM(IFLEMT,7)=NCRCUM(IFLEMT,7)+LTIME
      NCLOCK(IFLEMT)=MTIME+LTIME
      NCYCLE=NCRCUM(IFLEMT,1)+1
      WRITE(NTAPE2,230) NCODE(2),NCYCLE,IELEMT,MTIME,ITEMP,LTIME
  230 FORMAT(1X,I2,11I7)
      WRITE(NTAPE,250) ISLOT,ITEMP,OTIME
  250 FORMAT(1X,17HCRAFT LEAVES SLOT,I4,26H  TRAVEL TIME TO LUS QUEUE,I3
     .,4H  IS,F8.2,8H  HOURS.)
 1000 RETURN
      END
```

```
      SUBROUTINE CUMOUT(LETIME)
C
C          CUMULATIVE OUTPUT--WRITE CUMULATIVE OUTPUT STATISTICS AT A
C          SPECIFIED INTERVAL.
C
C*****
C
      COMMON/A01/NCLOCK(100),NEVTYP(100),NOPEL(100),NELEMT(6),NCODE(20),
     *            NCLKEL,NLSTEL,MTIME,IEVTYP,IELEMT,IACTEL,INTCUM,INTPER,
     *LETIME,LOTIME,NPRINT,NTAPE,NCARD,NTAPE1,NTAPE2,ICOUT,NTAPE3
C
      COMMON/A06/NCRTYP(10),NTKTYP(10),NLSTYP(15),NMHTYP(15,3),IDCRAF(30
     *),IDTRUK(30),IDLUS(30),IDSDVH(20),
     *            NCARTP,NCRFTP,NTRKTP,NLUSTP,NMHETP,NHTSTP,NCARHT,NMHEPL
     *,NLUS,NSI,NTAGTP
C
      COMMON/A13/NCRCUM(30,15),NTKCUM(30,9),MHECYC(15,3,2),MHECAR(15,3,
     *40),MHECUM(15,3, 4),LUSUSE(30,10),LUSCUM(30,2),NSICUM(2,40),NHSCUM
     *(20,7),NHSCRF(20,10),NTRAFF(2),NCRCAR(30,40),IMDCYC(30,2),KSTAT(30
     *,4,2),CSTAT(30,4,3)
     *,MHEEQ(15,3),MHETOT(15,3)
C*****
      INTEGER*2NEVTYP,        NOPEL ,         NELEMT,         NCODE        A1
      INTEGER*2NCRTYP,        NTKTYP,         NLSTYP,         NMHTYP       A6
      INTEGER*2IDCRAF,        IDTRUK,         IDLUS ,         IDSDVH       A6
      DIMENSION CITIME(15),PITIME(15)
C
C          WRITE HEADING
C
      OTIME=LOTIME/3600.
      IF(MTIME.LT.0) OTIME=LETIME/3600.
      WRITE(NTAPE1,10) OTIME
   10 FORMAT(1H1,24HCUMULATIVE STATISTICS AT F8.2,7H  HOURS)
C
C          WRITE CRAFT STATISTICS
C
      WRITE(NTAPE1,20)
   20 FORMAT(1X//1X,16HCRAFT STATISTICS)
      WRITE(NTAPE1,205)
  205 FORMAT(5X,64HI   CYCLES    TIMES IN HOURS AND PERCENT OF TOTAL ELA
     *PSED TIME--)
      WRITE(NTAPE1,206)
  206 FORMAT(15X,102HSHIP-S| TRAVEL|MOORING|LOADING|     UN-| TRAVEL|
     *LUS| TRAVEL|     LUS| UNLOAD|WAITING|      LUS| TRAVEL
     *,8H|  REACH/16X,14HQUEUE| SHIP-S|,
     *          7X,1H|,7X, 72H|MOORING|SHIP TO|  QUEUE|  LUS Q|  SETUP| A
     *T LUS|     TO|  SHUT-| LUS TO
     *,8H|   HOLD/21X,5H|    Q TO|,7X,1H|,7X,1H|,7X,
     *,9H|  LUS Q|,7X,5H| TO LUS|,7X,1H|,7X, 24H| UNLOAD|   DOWN|SHIP-S
     *,8H|  QUEUE/21X,9H|    SHIP|,10(7X,1H|),8H  QUEUE|)
      WRITE(NTAPE1,200)(I,I=1,15)
      WRITE(NTAPE1,230)
      L2=NELEMT(1)
      DO 30 I=1,L2
      DO 25 J=2,15
      OITIME(J)=NCRCUM(I,J)/3600.
   25 PITIME(J)=100.*OITIME(J)/OTIME
      WRITE(NTAPE1,220)I,NCRCUM(I,1),(OITIME(J),J=2,15)
   30 WRITE(NTAPE1,221) (PITIME(J),J=2,15)
C
C          CRAFT CARGO--CUMULATIVE
C
      WRITE(NTAPE1,1005)
 1005 FORMAT(1X//1X,22HCUMULATIVE CRAFT CARGO)
      L2=NCARTP+1
      WRITE(NTAPE1,1010) (I,I=1,L2)
 1010 FORMAT(1X,5HCRAFT, 7X,33HNUMBER OF CARGO ITEMS BY MODULE--/13X,27I
     *4/13X,13I4)
      WRITE(NTAPE1,230)
      L1=NELEMT(1)
      DO 1020 I=1,L1
 1020 WRITE(NTAPE1,1030) I,(NCRCAR(I,J),J=1,L2)
 1030 FORMAT(1X,5HCRAFT,I3,4X,27I4/13X,13I4)
C
C          TRUCK STATISTICS
C
      WRITE(NTAPE1,50)
   50 FORMAT(1X//1X,16HTRUCK STATISTICS)
      WRITE(NTAPE1,210)
      WRITE(NTAPE1,55)
   55 FORMAT(16X,61HTRUCK|LOADING|WAITING|LOADING| TRAVEL|     UN-|WAITIN
     *G| TRAVEL/16X,62HQUEUE|  AT LUS|  AT LUS|AT THA/| LOADED|LOADING|FOR
     * UN-|UNLOADED/21X,1H|,7X,1H|,7X,9H|     ISS|,7X,1H|,7X,9H|LOADING|)
      WRITE(NTAPE1,200) (I,I=1,9)
      WRITE(NTAPE1,230)
      L2=NELEMT(2)-1
      DO 70 I=1,L2
      DO 60 J=2,9
   60 OITIME(J)=NTKCUM(I,J)/3600.
   70 WRITE(NTAPE1,220)I,NTKCUM(I,1),(OITIME(J),J= 2,9)
C
C          MHE STATISTICS
C
C
C          WRITE MHE POOLS
C
      WRITE(NTAPE1,72) (I,I=1,NMHETP)
   72 FORMAT(1X//1X,12HMHE POOLS-- /1X,8HMHE POOL,6X,11HMHE TYPES--/14X,
     *15I6)
      WRITE(NTAPE1,230)
      WRITE(NTAPE1,73)
   73 FORMAT(1X,25HMHE IN POOLS AT PRESENT--)
      DO 74 I=1,NMHEPL
   74 WRITE(NTAPE1,75) I,(NMHTYP(J,I),J=1,NMHETP)
   75 FORMAT(1X,I8,5X,15I6)
C
C          WRITE ESTIMATED MHE REQUIREMENT.
C
      OTIME2=INTPER/3600.
      WRITE(NTAPE1,76) OTIME2
   76 FORMAT(1X,45HESTIMATED MHE REQUIREMENTS BASED ON CHECKS AT,F7.2,17
     *H  HOUR INTERVALS-)
```

```
      DO 77 I=1,NMHEPL
   77 WRITE(NTAPE1,75) I,(MHEREQ(J,I),J=1,NMHETP)
      WRITE(NTAPE1,80)
   80 FORMAT(1X//1X,14HMHE STATISTICS)
      WRITE(NTAPE1,90)
   90 FORMAT(4X,24HMHE| POOL|CYCLES--    |TIMES--/3X, 'HTYPE|,5X,3HH|  LU
     .S| THA/|LOADING|LOADING|UNLOADING/7X,1H|,5X,1H|,5X,23H| ISS/| AT L
     .US|AT THA/|/2X,3(5X,1H|),6HREPOT|,7X,9H|     ISS|)
      DO 130 I=1,NMHETF
      DO 130 J=1,3
      DO 100 K=1,3
  100 OITIME(K)=MHECUM(I,J,K)/3600.
      WRITE(NTAPE1,120)I,J,(MHECYC(I,J,K),K=1,2),(OITIME(K),K=1,3)
  120 FORMAT(1X/1X,4I6,3F8.2)
  130 WRITE(NTAPE1,240)(MHECAR(I,J,K),K=1,NCARTP)
C
C              LUS STATISTICS
C
      WRITE(NTAPE1,140)
  140 FORMAT(1X//1X,14HLUS STATISTICS/2X,18H LUS ID     TIMES--/9X,20HOCC
     .UPIED    RESERVED)
      DO 152 I=1,NLUS
      DO 150 J=1,2
  150 OITIME(J)=LUSCUM(I,J)/3600.
  152 WRITE(NTAPE1,155)I,(OITIME(J),J=1,2),(LUSUSF(I,J),J=1,NCRFTP)
  155 FORMAT(1X/1X,I8,2F8.2/1X,15HCRAFT BY TYPE--/1X,40I3)
C
C              HATCH SLOT STATISTICS
C
      WRITE(NTAPE1,182)
  182 FORMAT(1X//1X,21HHATCH SLOT STATISTICS)
      L=0
      WRITE(NTAPE1,185)
  185 FORMAT(5X,2HID,6X,16HTIMES IN HOURS--/13X,58H| CLOSED|    OPEN|BLOC
     .KED|    OC-|  SAVED|  EMPTY|IN SYSTEM/6X,4(7X,1H|), 8H CUPIED|,2(7
     .X,1H|))
      WRITE(NTAPE1,200)L,(I,I=1,7)
      WRITE(NTAPE1,210)
      L2=NELEMT(4)
      DO 195 I=1,L2
      DO 190 J=1,7
  190 OITIME(J)=MHSCUM(I,J)/3600.
      WRITE(NTAPE1,220)I,L,(OITIME(J),J=1,7)
  195 WRITE(NTAPE1,196)(NHSCKF(I,J),J=1,NCRFTP)
  196 FORMAT(1X,17HCYCLES/CRAFT TYPE/1X,40I3)
      IF((ICOUT.EQ.1).OR.(ICOUT.EQ.3)) CALL OSTAT(LETIME)
      RETURN
  200 FORMAT(2X,I6,I6,13I9)
  210 FORMAT(5X,23HID  CYCLES     TIMES IN HOURS--)
  220 FORMAT(1X,2I6,14F8.2)
  221 FORMAT(14X,14(F7.2,1H|))
  230 FORMAT(1X,124(1H-))
  240 FORMAT(1X,17HCARGO BY MODULE--/1X,32I4/1X,32I4)
      END
```



```
      SUBROUTINE EVENT1
C           EVENT 1--CRAFT ARRIVES AT SHIP'S QUEUE.
C           PLACES CRAFT IN SHIP'S QUEUE AND SELECTS HATCH SLOT, IF
C           ANY.
C           ALTERNATE ENTRY POINTS--CHATSU-- SELECTS CRAFT FOR ALL
C           UNOCCUPIED HATCH SLOTS. CALLED BY SHIP ARRIVAL EVENT AND
C           CRAFT LEAVES HATCH SLOT EVENT.
C
C*****
C
      COMMON/A01/NFLOCK(100),NEVTYP(100),NOPEL(100),NELEMT(6),NCODE(20),
     .           NCLKFL,NLSTEL,MTIME,IEVTYP,IELEMT,IACTEL,INTCUM,INTPER,
     .LPTIME,LCTIME,NPRINT,NTAFF,NCARD,NTAFF1,NTAPE2,ICOUT,NTAPES
C
      COMMON/A02/CARGWT(40),CARGVL(40),CARGCT(40),ICARHL(40),NCGTAG(40)
C
      COMMON/A03/CRAFWT(10),CRAFVL(10),CRAFSP(10,4),CRAFHT(10),NCRAFM(10
     .),MULHAT(10),NCCITM(10,40),NFILE(10),CRAFES(10)
C
      COMMON/A04/TRUKWT(10),TRUKVL(10),TRUKSP(10,2),NTCITM(10,40),NPRTRK
     .(10,13),NPRTCG(30),MHEPRY(10,10,13),MHETRK(30),LEGTIM(13,15,10),LD
     .TGTM(13,15,10),
     .          KPRCAR,IPRTRK,ITRUCK,NTRUKG,NTRKPR
C
      COMMON/A05/NHSSHF( 5),NCHSHP( 5),IDSHIP( 5),ISHPHS(20),IDHSLT(20),
     .NCHCOR(20),LCCFS(20),NHATSS(20),NSTYP(20),MHATNO(20),IDCARH(20),NS
     .ROOM(20),NSTINE(20),NHATIX(100),NDCH(100),NACCES(100),NTOTAL(100),
     .NHTTAB(100,40),NSSST(5),
     .          ICHCOR,LINDEX
C
      COMMON/A06/NCRTYF(10),NTKTYF(10),NLSTYP(15),IMHTYP(15,3),IDCHAF(30
     .),IDTRUK(30),IFLLS(30),IISGVF(20),
     .          NCARTP,NCRFTP,NTKKTP,NLUSTP,NMHETF,NHTSTP,NCFSHT,NMHEPL
     .,NLUS,NSI,NTAGTP
C
      COMMON/A09/LISTCR(30),LISTHS(24),NSOFT(3 ),NPRCAF(20),NPRCHC(10,10
     .,13),
     .          NLISCR,NLISHS,ISLOT,ICRAFT
C
      COMMON/A11/NCITEM(40),NPLAT(20),
     .          ITIME,LDTIME,JSLCT,JHATCH,WEIGHT,VOLUME,L1,L3,CCWT,CCVL
     .          ,INDEX,NCONTR,CCES,FLOOR
C
      COMMON/A13/NCRCUM(30,15),NTKCUM(30,9),MHECYC(15,3,2),MHECAR(15,3,
     .40),MHECUM(15,3, 4),LUSUSE(20,10),LUSCUM(30,2),NSTCUM(2,40),NHSCUM
     .(20,7),NHSCKF(20,10),NTRAFF(2),NCRCAR(30,40),IMCCYC(30,2),KSTAT(30
     .,4,2),CSTAT(30,4,3)
C*****
      INTEGER*2NEVTYP,       NOPEL ,         NELEMT,         NCODE         A1
      INTEGER*2NCARHL,       NCGTAG                                        A2
      INTEGER*2NCRAFM,       MULHAT,         NCCITM,         NFILE         A3
      INTEGER*2NTCITM,       NPRTRK,         NPRTCG,         MHEPRY        A4
      INTEGER*2MHETRK,       LEGTIM,         LDTGTM                        A4
      INTEGER*2NHSSHP,       NCHSHP,         IDSHIP,         ISHPHS        A5
      INTEGER*2IDHSLT,       NCHCOR,         LCCHS ,         NHATSS        A5
      INTEGER*2NSTYP ,       MHATNO,         IDCARH,         NSROOM        A5
```

```
      INTEGER*2NSTINP,        NHATIX,     NDCP ,       NACCES       A5
      INTEGER*2NTOTAL,        NHTTAP,     NSSSI                     A5
      INTEGER*2NCRTYP,        NTKTYP,     NLSTYP,      NMHTYP       A6
      INTEGER*2IECRAF,        IFTRUK,     IDLUS ,      IDSOVH       A6
      INTEGER*2LISTCR,        LISTHS,     NSORT ,      NPRCAR       A9
      INTEGER*2NPRCHC                                               A9
      INTEGER*2NCITEM,        NPLAT                                 A11
C
C           PLACE CRAFT IN SHIP-S QUEUE.
C
      NCLOCK(IACTEL)=-NCLOCK(IACTEL)
      NCRCUM(IACTEL,1)=NCRCUM(IACTEL,1)+1
      NLISCR=NLISCR+1
C
C           PUT NEW CRAFT IN PROPER PLACE IN CRAFT SELECTION LIST.
C
      L2=NLISCR-1
      DO 2 I=1,L2
      J=NLISCR-I
      IF(LISTCR(J).LT.IACTEL) GOTO 3
      LISTCR(J+1)=LISTCR(J)
    2 CONTINUE
      LISTCR(1)=IACTEL
      L1=1
      GOTO 4
    3 LISTCR(J+1)=IACTEL
      L1=J+1
    4 CONTINUE
      L2=L1
C
C           UPDATE PRODUCTIVITY STATISTICS
C
      ISUB=INDCYC(IACTEL,1)
      ISUB1=MTIME-INDCYC(IACTEL,2)
      KSTAT(IACTEL,ISUB,2)=KSTAT(IACTEL,ISUB,2)+ISUB1
      OTIME=ISUB1/3600.
      WRITE(NTAPE,5) IACTEL,OTIME
    5 FORMAT(1X,5HCRAFT,I4,26H  ARRIVES AT SHIP-S QUEUE.,F10.2,12H  HOUR
     . CYCLE)
      GO TO 10
C
C           ENTRY TO SELECT CRAFT FOR ALL OPEN HATCH SLOTS.
C
      ENTRY CRATSU
   20 IF(NLISCR.EQ.0) GO TO 1000
      L1=1
      L2=NLISCR
C     CHECK FOR ANY UNOCCUPIED HATCH SLOTS
   10 IF(NLISHS.EQ.0) GO TO 1000
      IBLOCK=0
      IPR=0
C           LOOP THRU HATCH SLOTS AND CRAFT IN SELECTION LISTS.
      DO 100 I=1,NLISHS
      KTYPE=LISTHS(I)
      JTYPE=NCHCCR(KTYPE)
      LTYPE=NPRCAR(JTYPE)
```



```
      IF(LOCHC(KTYPE).EQ.0) LTYPE=NPLAT(KTYPE)
C           HIGHEST PRIORITY CARGO NOT =0?
      IF(LTYPE.GT.0) GOTO 35
      WRITE(NPRINT,30) KTYPE,JTYPE,NHATSS(KTYPE),LTYPE
   30 FORMAT(1X,17HLOGIC ERROR--SLOT,I3,10H  AT HATCH,I3,11H  HAS STATE,
     .I3,11H  AND CARGO,I4)
      NHATSS(KTYPE)=3
      GOTO 100
   35 JTYPE=NCHTAG(LTYPE)
      ITYPE=IDHSLT(KTYPE)
      DO 90 J=L1,L2
      K=J
      KTYPE=LISTCR(K)
      KTYPE=IDCRAF(KTYPE)
C           TEST FOR HIGHER PRIORITY
      IF(IPR.EQ.0) GO TO 40
      IF((NPRCHC(KTYPE,ITYPE,JTYPE).EQ.0).OR.(NPRCHC(KTYPE,ITYPE,JTYPE).
     .GE.IPR)) GO TO 90
   40 IF(NCCITM(KTYPE,LTYPE).EQ.0) GOTO 90
C           SET NEW "BEST ASSIGNMENT"
   50 IPR=NPRCHC(KTYPE,ITYPE,JTYPE)
      ISLOT=LISTHS(I)
      ICRAFT=LISTCR(K)
      KCRAFT=K
   90 CONTINUE
  100 CONTINUE
C
C           HAS AN ASSIGNMENT BEEN FOUND?
C
      IF(IPR.EQ.0) GOTO 1000
C**********************************************************************
C           A CRAFT IS AVAILABLE FOR ASSIGNMENT TO A HATCH SLOT.
C           ASSIGN THE CRAFT,LOADIT, AND INVESTIGATE POSSIBILITY OF AN
C           ADDITIONAL CRAFT ASSIGNMENT.
C
C
C           IS CRAFT MULTI-HATCHED?
C
      ICRTYP=IDCRAF(ICRAFT)
      L2=MULHAT(ICRTYP)/10
      IF(L2.EQ.1) GO TO 300
C
C           CRAFT IS MULTI-HATCHED.  IS SHIP A GENERAL CARGO SHIP?
C
      ISHIP=NSHPHS(ISLOT)
      ISTYP=IDSHIP(ISHIP)
      IF(ISTYP.NE.1) GOTO 300
      NHATLD=MULHAT(ICRTYP)-L2*10
C
C           CHECK FOR ADJACENT BLOCKABLE SLOTS.
C           SET PARAMETERS TO FIND LOWEST AND HIGHEST BLOCKABLE SLOTS.
C
      NPLUS=ISLOT+L2-1
      NMINUS=ISLOT-L2+1
      IF(NMINUS.LE.0) NMINUS=1
      IPLUS=ISLOT
```

```
      IMINUS=ISLOT
C
C           IS ISLOT AND END SLOT?
C
      IF((LOCHS(ISLOT).NE.4).AND.(LOCHS(ISLOT).NE.2)) GOTO 120
C
C           DOES CRAFT LOAD AT MORE THAN 1 HATCH?
C
      IF(NHATLD.EQ.1) GOTO 300
C           RESET LAST SLOT TO END SLOT.
      IF(ISLOT.EQ.1) GOTO 110
      IF((LOCHS(ISLOT-1).NE.1).AND.(LOCHS(ISLOT-1).NE.3)) GOTO 110
      NPLUS=ISLOT
      GOTO 120
  110 NMINUS=ISLOT
C
C           FIND EXTENT OF BLOCKABLE SLOTS.
C           LOOK FOR HIGHEST SLOT.
  120 IF(IPLUS.GE.NPLUS) GOTO 160
  130 IPLUS=IPLUS+1
      IF((LOCHS(IPLUS).EQ.2) .OR.(LOCHS(IPLUS).EQ.4)) NPLUS=IPLUS
      IF((NHATSS(IPLUS).GE.2).AND.(NHATSS(IPLUS).LE.4)) GOTO 160
C           HIGHEST BLOCKABLE SLOT FOUND.
      NPLUS=IPLUS-1
C
C           LOOK FOR LOWEST SLOT.
C
  160 IF(IMINUS.LE.NMINUS) GOTO 180
      IMINUS=IMINUS-1
      IF((LOCHS(IMINUS).EQ.2).OR.(LOCHS(IMINUS).EQ.4)) NMINUS=IMINUS
      IF((NHATSS(IMINUS).GE.2).AND.(NHATSS(IMINUS).LE.4))GOTO 120
C           LOWEST BLOCKADE SLOT FOUND.
      NMINUS=IMINUS+1
C           HIGHEST AND LOWEST FOUND?
  180 IF(IPLUS.LT.NPLUS) GOTO 130
C
C           BLOCKABLE SLOTS FOUND.  ASSIGN OR SAVE CRAFT AND SLOTS.
C
      IF(NHATLD.LT.1) GOTO 210
C           ARE BLOCKABLE SLOTS END SLOTS?
      IF((LOCHS(NPLUS).EQ.2).OR.(LOCHS(NPLUS).EQ.4)) GOTO 195
      IF((LOCHS(NMINUS).EQ.2).OR.(LOCHS(NMINUS).EQ.4)) GOTO 200
      GOTO 210
  195 NMINUS=ISLOT
      GOTO 2000
  200 NPLUS=ISLOT
      GOTO 2000
C
C           ARE THERE ENOUGH BLOCKABLE SLOTS TO ASSIGN CRAFT?
C
  210 IF((NPLUS-NMINUS+1).LT.L2) GOTO 3000
  215 IF((NPLUS-NMINUS+1).EQ.L2) GOTO 2000
C
C           MORE THAN ENOUGH BLOCKABLE SLOTS.  BLOCK CLOSED OR EMPTY
C           SLOTS IF POSSIBLE.
C
```



```
      IF(NMINUS.EQ.ISLOT) GOTO 220
      IF(NPLUS.EQ.ISLOT) GOTO 230
      GOTO 240
  220 NPLUS=ISLOT+L2-1
      GOTO 2000
  230 NMINUS=ISLOT-L2+1
      GOTO 2000
C
C           FIND BEST SLOTS.
C
  240 IF(NHATLD.GT.1) GOTO 250
C           TRY TO BLOCK EMPTY OR CLOSED SLOTS IF CRAFT LOADS AT ONE
C           HATCH.
      IF(NHATSS(NMINUS).EQ.4) GOTO 260
      GOTO 270
C           TRY TO FIND AN OPEN SLOT FOR MULTI-HATCH-LOADING CRAFT.
  250 IF(NHATSS(NMINUS).EQ.4) GOTO 270
  260 NMINUS=NMINUS+1
      GOTO 215
  270 NPLUS=NPLUS-1
      GOTO 215
C
C           BLOCK ALL SLOTS FROM NMINUS TO NPLUS FOR MULTI-HATCH CRAFT
C           ASSIGNMENT.
 2000 DO 2100 I=NMINUS,NPLUS
      IF(I.EQ.ISLOT) GOTO 2100
C           RESET HATCH SLOT STATE TO BLOCKED.
      NSTATE=NHATSS(I)
      NHATNO(I)=ISLOT
      WRITE(NTAPE,2010) I,ICRAFT,ISLOT
 2010 FORMAT(1X,10HHATCH SLOT,I3,18H  BLOCKED BY CRAFT,I3, 9H  AT SLOT,
     .I3)
      GOTO(1200,2020,2030,2040),NSTATE
C           CLOSE AND BLOCKED.
 2020 NHATSS(I)=6
      GOTO 2100
C           EMPTY AND BLOCKED.
 2030 NHATSS(I)=5
      GOTO 2100
C           UNOCCUPIED AND BLOCKED.
 2040 NHATSS(I)=5
      ICLKEL=NCLKEL+NELEMT(3)+1
      NHSCLM(I,2)=NHSCLM(I,2)+MTIME+NCLOCK(ICLKEL)
      NCLOCK(ICLKEL)=-MTIME
      NEVTYP(ICLKEL)=3
 2100 CONTINUE
      GOTO 300
C
C           CRAFT CANNOT BE ASSIGNED DUE TO OCCUPIED ADJACENT SLOTS.
C           SAVE AVAILABLE SLOTS,AND CRAFT.
C
 3000 DO 3200 I=NMINUS,NPLUS
      IF(I.EQ.ISLOT) GOTO 3150
      NSTATE=NHATSS(I)
      NHATNO(I)=ISLOT
      WRITE(NTAPE,3010) I,ICRAFT,ISLOT
```

```
3010 FORMAT(1X,19HHATCH SLOT,I3,25H  SAVED FOR BLOCKING BY CRAFT,I3,6H
    . AT SLOT,I3)
     GOTO(1200,3020,3030,3040),NSTATE
C              SAVED FOR BLOCKING AND CLOSED.
3020 NHATS(I)=11
     GOTO 3200
C              SAVED FOR BLOCKING AND EMPTY.
3030 NHATS(I)=12
     GOTO 3200
C              SAVED FOR BLOCKING AND UNOCCUPIED.
3040 NHATS(I)=8
     ICLKEL=NCLKEL+NELEMT(3)+I
     NHSCUM(I,2)=NHSCUM(I,2)+MTIME+NCLOCK(ICLKEL)
     NCLOCK(ICLKEL)=-MTIME
     NEVTYP(ICLKEL)=0
     GOTO 3200
C
C              SAVE CRAFT AND "ASSIGNED" SLOT.
C
3150 NHATS(I)=7
     NHATNO(I)=ICRAFT
     NOPEL(ICRAFT)=I
     ICLKEL=NCLKEL+NELEMT(3)+I
     NHSCUM(I,2)=NHSCUM(I,2)+MTIME+NCLOCK(ICLKEL)
     NCLOCK(ICLKEL)=-MTIME
     NEVTYP(ICLKEL)=0
     IBLOCK=NBLLS-NMINUS+1
     WRITE(NTAPE,3160) IPR,ICRAFT,L2    ,ISLOT
3160 FORMAT(1X, 9HPRIORITY,I3,19H  ASSIGNMENT--CRAFT,I3,11H  REQUIRING,
    .I3,31H  SLOTS IS SAVED FOR HATCH SLOT,I3)
3200 CONTINUE
     GOTO 600
C
C     SET HATCH SLOT TO OCCUPIED.
C
 300 NHATS(ISLOT)=10
     NHATNO(ISLOT)=ICRAFT
     NOPEL(ICRAFT)=ISLOT
     JCLKEL=NCLKEL+NELEMT(3)+ISLOT
     NHSCUM(ISLOT,2)=NHSCUM(ISLOT,2)+MTIME+NCLOCK(JCLKEL)
     NEVTYP(JCLKEL)=0
     WRITE(NTAPE,310)ICRAFT,ISLOT,IPR
 310 FORMAT(1X,5HCRAFT,I4,20H  SENT TO HATCH SLOT,I4,10H  PRIORITY,I4,1
    .2H  ASSIGNMENT)
C
C              LOAD CRAFT
C
     CALL LOADER
 495 CONTINUE
C
C              UPDATE CRAFT SELECTION LIST.
C
 500 NLISCR=NLISCR-1
     IF(NLISCR.LE.3) GO TO 600
     IF(KCRAFT.EQ.(NLISCR+1)) GO TO 600
     DO 550 I=KCRAFT,NLISCR
```



```
 550 LISTCR(I)=LISTCR(I+1)
 600 LISTCR(NLISCR+1)=0
C
C     UPDATE HATCH SLOT SELECTION LIST.
C
     IF(IEVTYP.EQ.14) IEVTYP=1
     CALL HSSORT
     IF(IEVTYP.NE.1) GOTO 20
1000 RETURN
C
C              ERROR ROUTINE
C
1200 WRITE(NTAPE,1210)I
1210 FORMAT(1X,10HHATCH SLOT,I4,49H  IS IN SELECTION LIST ALTHOUGH IT H
    .ASN-T ARRIVED)
     CALL WCLOCK
     STOP
     END
```

```
      SUBROUTINE EVENT2
C
C
C             EVENT 2--CRAFT LEAVES HATCH SLOT.
C             SENDS CRAFT TO LUS QUEUE.
C             ASSIGNS ANOTHER CRAFT TO VACATED HATCH SLOTS, IF POSSIBLE.
C
C*****
C
      COMMON/A01/NCLOCK(100),NEVTYP(100),NOPEL(100),NELEMT(6),NCODE(20),
     .             NCLKEL,NLSTEL,MTIME,IEVTYP,IELEMT,IACTEL,INTCUM,INTPER,
     .LPTIME,LETIME,NPRINT,NTAPE,NCARD,NTAPE1,NTAPE2,ICOUT,NTAPE3
C
      COMMON/A02/CAPCWT(40),CARGVL(40),CARGCT(40),NCARPL(40),NCGTAG(40)
C
      COMMON/A03/CRAFWT(10),CRAFVL(10),CRAFSP(10,4),CRAFHT(10),NCRAFM(10
     .),MULHAT(10),NCCITM(10,40),NFILE(10),CRAFFS(10)
C
      COMMON/A04/TRUKWT(10),TRUKVL(10),TRUKSP(10,2),NTCITM(10,40),NPRTRK
     .(10,13),NPRTCG(30),MHEPRY(15,10,13),MHETRK(30),LOGTTM(13,15,10),LD
     .TLTM(13,15,10),
     .             KPECAR,IPRTRK,ITRUCK,NTRUKQ,NTRKPR
C
      COMMON/A05/NESSHP( 5),NCHSHP( 5),IDSHIP( 5),NSHPHS(20),IDHSLT(20),
     .NCHC R(20),LOCHS(20),NHATSS(20),NSTYP(20),NHATNO(20),IDCARH(20),NS
     .BOOM(20),NSTINC(20),NHATTX(100),NDCP(100),NACCES(100),NTOTAL(100),
     .NHTTAB(100,40),NSSSI(5),
     .             ICHCOR,LINDEX
C
      COMMON/A06/NCRTYP(10),NTKTYP(10),NLSTYP(15),NMHTYP(15,3),IDCRAF(30
     .),IDTRUK(30),IDLUS(30),IDSDVH(20),
     .             NCARTF,NCRFTP,NTRKTP,NLLSTP,NMHETP,NHTSTP,NCARHT,NMHEPL
     .,NLUS,NSI,NTASTP
C
      COMMON/A07/DIST( 9),CAPST(3),ACAFST(3),LUSCRF(30),LUSTRK(30),LUSMH
     .E(30),LUSLOC(15),LUSSTT(15),LDCCTM(13,15,10),LDCTTM(13,15,10)
C
      COMMON/A08/LCRCAR(30,40),LTKCAR(30,40),LSTCAR(3,40)
C
      COMMON/A09/LISTCR(30),LISTHS(24),NSOFT(30),NFRCAR(20),NPRCHC(10,10
     .,13),
     .             NLISCR,NLISHS,ISLOT,ICRAFT
C
      COMMON/A10/MOORTM(10,10),LOADTM(10,10,13),
     .NCHT,NOECKC,NRTMFO,NRTM15,NSMT,NSIMT,NHELOC,NSIWT
C
      COMMON/A11/NCITEM(40),NPLAT(20),
     .             ITIME,LETIME,JSLOT,JHATCH,WEIGHT,VOLUME,L1,L3,CCWT,CCVL
     .             ,INDEX,NCCNTR,CCFS,FLCOR
C
      COMMON/A13/NCRCUM(30,15),NTKCUM(30,9),MHECYC(15,3,2),MHECAR(15,3,
     .40),MHECUM(15,3, 4),LUSUSE(30,10),LUSCUM(30,2),LSTCUM(2,40),MHSCUM
     .(20,7),MHSCHE(20,10),NTRAFF(2),NCRCAR(30,40),INDCYC(30,2),KSTAT(30
     .,4,2),CSTAT(3,4,3)
C*****
      INTEGER*2NEVTYP,        NOPEL ,        NELEMT,        NCODE          A1
      INTEGER*2NCAPHL,        NCGTAG                                       A2
      INTEGER*2NCRAFM,        MULHAT,        NCCITM,        NFILE          A3
      INTEGER*2NTCITM,        NPRTRK,        NPRTCG,        MHEPRY         A4
      INTEGER*2MHETRK,        LOGTTM,        LDTGTM                        A4
      INTEGER*2NESSHP,        NCHSHP,        IDSHIP,        NSHPHS         A5
      INTEGER*2IDHSLT,        NCHCOR,        LOCHS ,        NHATSS         A5
      INTEGER*2NSTYP ,        NHATNO,        IDCARH,        NSBOOM         A5
      INTEGER*2NSTINC,        NHATIX,        NDCP  ,        NACCES         A5
      INTEGER*2NTOTAL,        NHTTAB,        NSSSI                         A5
      INTEGER*2NCRTYP,        NTKTYP,        NLSTYP,        NMHTYP         A6
      INTEGER*2IDCRAF,        IDTRUK,        IDLUS ,        IDSDVH         A6
      INTEGER*2LUSCRF,        LUSTRK,        LUSMHE,        LUSLOC         A7
      INTEGER*2LUSSTT,        LDCGTM,        LDCTTM                        A7
      INTEGER*2LCRCAR,        LTKCAR,        LSTCAR                        A8
      INTEGER*2LISTCR,        LISTHS,        NSCRT ,        NPRCAR         A9
      INTEGER*2NPRCHC                                                      A9
      INTEGER*2MOORTM,        LOADTM                                       A1
      INTEGER*2NCITEM,        NPLAT                                        A11
      WRITE(NTAPE,5)
    5 FORMAT(1X,29HCRAFT LEAVES HATCH SLOT EVENT)
      ICRTYP=IDCRAF(IELEMT)
      ISLOT=NOPEL(IELEMT)
C
C             NOTE ABOUT FLAGS--
C             IFLAG=1   SHIP IS NOT EMPTY.
C             JFLAG=1   ENTRY AT SHPDEP.
C             KFLAG=1   CALL MINCLK REQUIRED.
C             MFLAG=1   HC SLOT EMPTY.
C                  =2   HELICOPTER SLOT CLOSED BECAUSE OF NO ACCESSIBLE
C                       CONTAINER.
C                  =3   HC SLOT NOT EMPTY
C             NFLAG   ARGUMENT FOR ENSSHS
C                  =1   EXAMINE SHPDEP
C
      IFLAG=0
      JFLAG=0
      KFLAG=0
      MFLAG=0
      NFLAG=0
      IWAIT=0
      IHATCH=NCHCOR(ISLOT)
      ISLTYP=IDHSLT(ISLOT)
      ISTYP=NSTYP(ISLTYP)
C
C             SEND DEPARTING CRAFT TO LUS QUEUE.
C
      CALL CREDES
C
C             CRAFT LEAVING SS CONTAINER SHIP?
C
      GOTO(1030,1030,1100,1100,1500),ISTYP
C
C             SS CONTAINER SHIP.  HELICOPTER DEPARTING?
C
 1030 IF(NCRAFM(ICRTYP).NE.6) GOTO 1300
C
```

```
C         HELICOPTER LEAVING PLATFORM.  RESET HATCH SLOT STATE.
C
      NPLAT(ISLOT)=0
      NHATSS(ISLOT)=2
C
C         GANTRY WORKING SHIPSIDE SLOT?
C
      L2=NELEMT(1)
      KHATCH=NCHCOR(ISLOT)
      DO 1050 I=1,L2
      IF((NEVTYP(I).NE.2).AND.(NEVTYP(I).NE.19)) GOTO 1050
      IF( I.EQ.IACTEL) GOTO 1050
      KSLOT=NOFFL(IELEMT)
      IF(KHATCH.NE.NCHCOR(KSLOT)) GOTO 1050
      IF(NPLOCK(I).LT.0) GOTO 1045
C
C         GANTRY BUSY.  HELICOPTER SLOT CANNOT BE OPEN.
C
      GOTO 1000
C         WAITING WATER-CRAFT
 1040 IWAIT=1
      GOTO 1060
 1050 CONTINUE
 1060 KFLAG=0
 1070 KFLA =0
C
C         PUT CONTAINER ON HELICOPTER PLATFORM.
C
      KCRAFT=0
      NSLOT=ISLOT
      CALL HELPLT(MFLAG,NSLOT,KCRAFT)
C
C         CHECK INDICATOR TO DETERMINE NECESSITY FOR CHECKING FOR--
C         1.  SHIP DEPARTURE OR
C         2.  CRAFT ASSIGNMENT TO VACATED SLOT.
C
      KFLA =1
      JCLKEL=NCLKEL+NELEMT(3)+NSLOT-1
      JSLOT=NSLOT-1
      IHATCH=NCHCOR(JSLOT)
      IF(MFLAG.EQ.1) GOTO 151
C
C         UPDATE HATCH SLOT LIST AND CHECK CRAFT SELECTION
C
      GOTO 600
C
C         WATER-CRAFT LEAVING SS CONTAINER SHIP SLOT SHARING GANTRY
C         WITH HELICOPTER PLATFORM?
C
 1300 IF(NCHCOR(ISLOT+1).NE.IHATCH) GOTO 110
C
C         NEITHER CONTAINER NOR HELICOPTER AT PLATFORM?
C
      IF(NHATSS(ISLOT).NE. 2) GOTO 110
      IF(NPLAT(ISLOT).NE.0) WRITE(NPRINT,1305) ISLOT,NHATSS(ISLOT),
     .NPLAT(ISLOT)
```



```
 1305 FORMAT(1X,17HLOGIC ERROR--SLOT,I4,12H  WITH STATE,I4,29H  AND PLAT
     .FORM CONTAINER TYPE,I4)
C
C         ANY HELICOPTERS IN THE SYSTEM?
C
      DO 1310 I=1,NCREIP
      IF((NCRTYP(I).GT.0).AND.(NCRAFM(I).EQ.6)) GOTO 1320
 1310 CONTINUE
C
C         NO HELICOPTERS.
C
      GOTO 110
 1320 KFLAG=1
      GOTO 1070
C
C         CRAFT IS LEAVING A SS CONTAINER SHIP.
C         IS CRAFT A HELICOPTER?
 1500 IF(NCRAFM(ICHTYP).EQ.6) GOTO 1570
C
C         WATER-CRAFT.  UPDATE NPLAT VALUE FOR CORRESPONDING
C         HELICOPTER SLOT.
C
C         FIND HELICOPTER SLOT.
      L1=ISLOT+1
      L2=NELEMT(4)
      DO 1510 I=L1,L2
      IF(IHATCH.EQ.NCHCOR(I)) GOTO 1520
 1510 CONTINUE
      WRITE(NPRINT,1512) IHATCH,ISLOT
 1512 FORMAT(1X,11HCARGO HATCH,I4,6H  SLOT,I4,20H  NO HELICOPTER SLOT)
      GO TO 1570
C
C         FIND HIGHEST PRIORITY SNATCHABLE CARGO.
C         FIND MAX. ALLOWABLE CONTAINER WT.
 1520 JSLOT=I
      WTMAX=0.
      DO 1525 I=1,NCREIP
      IF((NCRAFM(I).NE.6).OR.(NCRTYP(I).LE.0).OR.(WTMAX.GT.CRAFWT(I)))
     .GOTO 1525
      WTMAX=CRAFWT(I)
 1525 CONTINUE
      IDUM=1
      IF(WTMAX.LT..001) GOTO 1545
C
C         SEARCH HATCH TABLES.
      IDUM=0
      L1=NSTINI(IHATCH)
      L2=LINDEX
      IF(IHATCH.LT.NCARNT) L2=NSTINI(IHATCH+1)-1
      DO 1540 I=L1,L2
      IF(NTOTAL(I).EQ.0) GOTO 1540
      DO 1535 J=1,NCARTP
      IF((J.GT.NSHCOM(IHATCH)).AND.(LOCHS(JSLOT).EQ.0)) GOTO 1540
      IF(NHTTAL(I,J).EQ.0) GOTO 1535
      IDUM=1
      IF(CARGWT(J).LE.WTMAX)  GOTO 1550
```

```
      GOTO 1545
 1535 CONTINUE
 1540 CONTINUE
C
C              NO CARGO FOUND.  SET TO EMPTY, OR CLOSED.
C
      NHATSS(JSLOT)=3
 1545 NHATNO(JSLOT)=0
      IF(ICUM.EQ.1) NHATSS(JSLOT)=2
      NPLAT(JSLOT)=0
      GOTO 1570
C
C              CARGO FOUND AT HELICOPTER SLOT.
C
 1550 NPLAT(JSLOT)=NFTTAB(I,J)
C
C              IS DEPARTED SLOT EMPTY (OR CLOSED)?
C
 1570 IF( CRAFM(ICRTYP).EQ.6) GOTO 1580
      IF(NPRCAR(IHATCH).NE.0) GOTO 200
      GOTO 1650
 1580 IF(NFLAT(ISLOT).EQ.0) GOTO 1650
C
C              HELICOPTER SLOT IS NOT EMPTY.  IS IT TOO CLOSE TO SEA
C              ISLAND?
C
C              SEA ISLAND AT THIS SHIP?
      ISHIP=NSPPHS(ISLOT)
      IF(NCSSI(ISHIP).EQ.0) GOTO 110
C              SEA ISLAND PRESENT.  FIND ACTIVE CARGO HATCH.
      L2=NELEMT(4)
      DO 1600 I=1,L2
      IF((NSHPHS(I).NE.ISHIP).OR.(LOCHS(I).NE.7)) GOTO 1600
      IF((NHATSS(I).EQ.4).OR.(NHATSS(I).EQ.10)) GOTO 1620
      ISUB=NCLKEL+NELEMT(3)
      IF(NEVTYP(ISUB).EQ.15) GOTO 1620
 1600 CONTINUE
C
C              NO SE SLOT ACTIVE.
C
      GOTO 110
C
C              IS WATER-CRAFT TOO CLOSE TO HELICOPTER?
C
 1620 IF((ISLOT-I).GE.2) GOTO 110
C
C              ACTIVE WATER-CRAFT SLOT IS TOO CLOSE TO HELICOPTER SLOT.
C              SET SLOT TO *CLOSE* AND FIND NEW SLOT.
C
      NHATSS(ISLOT)=2
      GOTO 16 5
C
C              CRAFT LEAVING AN EMPTY SLOT.  SET *EMPTY.*
C
 1650 NHATSS(ISLOT)=3
 1655 NHATNO(ISLOT)=0
```



```
C
C              FIND NEW HATCH SLOT FOR NSS CONTAINER SHIP.
C
      NFLAG=1
      NSLOT=ISLOT
      CALL FNSSHS(NSLOT,NFLAG)
      JCLKEL=NCLKEL+NELEMT(3)+ISL I
      IHATCH=NCHCOR(ISLOT)
      IF(NFLAG.EQ.1) GOTO 151
      RETURN
C
C     CHECK FOR MULTI-HATCHED CRAFT.
C
    6 NHATHL=MULHAT(ICRTYP)/10
      LSLOT1=ISLOT
      LSLOT2=ISLOT
      IF(ISTYP.NE.1) GO TO 110
      IF(NHATBL.EQ.1) GO TO 110
C
C              CRAFT IS MULTI-HATCHED.
C              SET NEW HATCH SLOT STATES FOR "BLOCKED" SLOTS.
C
      J=0
      LSLOT1=0
      L2=NELEMT(4)
      DO 100 I=1,L2
      IF(NSHPHS(I).NE.NSHPHS(ISLOT)) GOTO 100
      IF(((NHATSS(I).EQ.5).OR.(NHATSS(I).EQ.6).OR.(NHATSS(I).EQ.9)).AND.
     *(NHATNO(I).EQ.ISLOT)) GO TO 15
      GO TO 100
C
C              SLOT WAS "BLOCKED."
C
C              SET BLOCKED SLOTS.
   15 IF(LSLOT1.EQ.0) LSLOT1=I
      IF(I.GT.ISLOT) LSLOT2=I
C              IS SLOT EMPTY?
      ITEMP=NCHCOR(I)
      IF(NPRCAR(ITEMP).NE.0) GO TO 20
C     SLOT IS EMPTY.
      NHATSS(I)=3
      NHATNO(I)=0
      GO TO 90
C
C              IS SLOT CLOSED DUE TO ROOM TYPE?
   20 IF(NHATSS(I).NE.6) GO TO 30
      NHATSS(I)=2
      NHATNO(I)=0
      IFLAG=1
      GO TO 90
C
C              IS SLOT "UNOCCUPIED?"
C
   30 IF(NHATSS(I).NE.5) GO TO 40
      NHATSS(I)=4
      NHATNO(I)=0
```

```
      IFLAG=1
      ICLKEL=NCLKEL+NELEMT(3)+1
      NHSCUM(I,3)=NHSCUM(I,3)+MTIME+NCLOCK(ICLKEL)
      NEVTYP(ICLKEL)=-1
      NCLOCK(ICLKEL)=-MTIME
      GO TO 90
C
C              IMPOSSIBLE HATCH SLOT STATE.
C
   40 WRITE (NPRINT,50)I,NHATSS(I),NHATNO(I)
   50 FORMAT(1X,4HSLOT,I4,11H  HAS STATE,I4,9H  NUMBER=,I4,13H  LOGIC ER
     *ROR)
   90 WRITE (NTAPE,95)I,ISLOT,NHATSS(I)
   95 FORMAT(1X,4HSLOT,I4,19H  BLOCKED FROM SLOT,I4,16H  HAS NEW STATE=,
     *I4)
  100 CONTINUE
      GO TO 42
   41 CONTINUE
      WRITE (NPRINT,50)I,NHATSS(I),NHATNO(I)
      WRITE (NTAPE,95)I,ISLOT,NHATSS(I)
   42 CONTINUE
      IF(LSLOT1.EQ.0) LSLOT1=ISLOT
      IF(LSLOT1.GT.ISLOT) LSLOT1=ISLOT
C
C              IS THE HATCH THAT WAS JUST UNLOADED EMPTY?
C
  110 IF(NHCAR(IHATCH).NE.0) GO TO 200
C              CARGO HATCH IS EMPTY.
      NHATSS(ISLOT)=3
      NHATNO(ISLOT)=0
      JSLOT=0
C
C              LOOK FOR OPPOSITE SLOT TO SET EMPTY.
C
      L2=NELEMT(4)
      DO 120 I=1,L2
      IF((NCHCOR(I).EQ.IHATCH).AND.(I.NE.ISLOT)) GO TO 130
  120 CONTINUE
      GO TO 140
  130 JSLOT=I
      NHATSS(JSLOT)=3
      JCLKEL=NCLKEL+NELEMT(3)+JSLOT
  140 CONTINUE
C
      NCLOCK(JCLKEL)=-MTIME
    0 WRITE (NTAPE,150)IHATCH,ISLOT,JSLOT
  150 FORMAT(1X,11HCARGO HATCH,I4,27H  IS EMPTY WITH HATCH SLOTS,I4,5H
     *AND,I4)
C
      IF(IFLAG.EQ.1) GO TO 250
C              IS SHIP EMPTY SO THAT ITMAY DEPART?
C
        ENTRY 155
C
C              ENTRY TO CHECK FOR SHIP DEPARTURE, INCLUDING SHIP AT CAUSE
C              WAY.
```



```
C
      ENTRY SHDEP
      JFLAG=1
      IFLAG=0
      IHATCH=NCHCOR(ISLOT)
  155 ITEMP=NSHPES(ISLOT)
      L2=NELEMT(4)
      IF((NHATSS(I).NE.3).AND.(NSHPHS(I).EQ.ITEMP)) GO TO 250
      DO 160 I=1,L2
  160 CONTINUE
C              SHIP IS EMPTY.
      ICLKEL=ITEMP+NCLKEL
C
C              UPDATE HATCH SLOT STATISTICS
C
      ISUM1=MTIME+NCLOCK(ICLKEL)
      L2=NELEMT(4)
      DO 165 I=1,L2
      IF(NSHPHS(I).NE.ITEMP) GOTO 165
      ISUM=NCLKEL+NELEMT(3)+I
      NHSCUM(I,6)=NHSCUM(I,6)+MTIME+NCLOCK(ISUM)
      NHSCUM(I,7)=ISUM1
  165 CONTINUE
      WRITE(NTAPE2,168) NCODE(16),ITEMP,MTIME,ISUM1
  168 FORMAT(1X,I2,11I7)
C
      NCLOCK(ICLKEL)= -MTIME
      NEVTYP(ICLKEL)=-1
      OTIME=MTIME/3600.
      WRITE(NTAPE1,170)ITEMP,ICLKEL,OTIME
  170 FORMAT(1X,8HSHIP NO.,I3,8H  (ELEMT,I4,12H) DEPARTS AT,F10.2,6H HOU
     *RS)
C
C              HAVE ALL SHIPS DEPARTED.
C
      L1=NCLKEL+1
      L2=NCLKEL+NELEMT(3)
      DO 180 I=L1,L2
      IF(NEVTYP(I).NE.-1) GO TO 195
  180 CONTINUE
      WRITE(NTAPE,190)
  190 FORMAT(1X,24HALL SHIPS HAVE DEPARTED.)
      GOTO 198
C
C              ALL SHIPS HAVE NOT DEPARTED.
C
C              ISS CONTAINER SHIP LEAVING A SEA ISLAND?
  195 IF(ISHIP(ITEMP).NE.5) GOTO 198
      IF(NSSSI(ITEMP).EQ.0) GOTO 198
C
C              SHIP IS LEAVING A SEA ISLAND.
C
      NSSSI(ITEMP)=0
      NSI=NSI+1
C              ASSIGN NEW SHIP?
      CALL SHPMOV
```

```
 198 CALL HSSORT
     GOTO 1000
C
C              HATCH IS NOT EMPTY.
C              FIND NEW STATE.
C
 200 ITEMP=NFRCAR(IHATCH)
     IFLAG=1
     ICLKEL=NCLKEL+NELEMT(3)+ISLOT
     IF((NOPEL(ICLKEL).EQ.80).AND.(MCARHL(ITEMP).EE.1)) GO TO 220
C              SLOT IS SET TO "UNOCCUPIED."
     NHATSS(ISLOT)=4
     NHATNO(ISLOT)=0
     NEVTYP(ICLKEL)=-1
     NCLOCK(ICLKEL)=-MTIME
     GO TO 250
C
C              SLOT MUST BE CLOSED DUE TO ROOM TYPE.
C
 220 NHATSS(ISLOT)=2
     NHATNO(ISLOT)=0
C              GENERATE REFRIG EVENT
     NCLOCK(ICLKEL)=MTIME+NRTM15
     NHSCUM(ISLOT,1)=NHSCUM(ISLOT,1)+NRTM15
     NEVTYP(ICLKEL)=15
     NOPEL(ICLKEL)=15
     OTIME= NCLOCK(ICLKEL)/3600.
     WRITE(NTAPE,231)ISLOT,ICLKEL,OTIME
C
C              REFRIG AT OPPOSITE SLOT?
C
     LOP=NELEMT(4)
     DO 225 I=1,LOP
     IF((ISLOT.NE.I).AND.(NCHCOR(I).EQ.IHATCH)) GOTO 226
 225 CONTINUE
     GOTO 240
 226 ITEMP=NCLKEL+NELEMT(3)+I
     NHATSS(I)=2
     NHATNO(I)=0
     NCLOCK(ITEMP)=MTIME+NRTM15
     ISUB=NCLKEL+NSHPES(ISLOT)
     NHSCUM(ISLOT,1)=NHSCUM(ISLOT,1)+NCLOCK(ISUB)+NCLOCK(ITEMP)
     NEVTYP(ITEMP)=15
     NOPEL(ITEMP)=15
     OTIME=NCLOCK(ITEMP)/3600.
     WRITE(NTAPE,231) I,ITEMP,OTIME
 230 FORMAT(1X,7HSLOT,I4,13H  ELEMENT NO.,I5,50H  IS CLOSED TO RIG 15 T
    .OR ROOM.  WILL BE FIGGED AT,F8.2,8H  HOURS.)
 240 KFLAG=1
C
C              EMPTY CAUSEWAY SLOT?
C
 250 IF(JFLAG.EQ.1) RETURN
C
C              NEW HATCH SLOT STATES HAVE BEEN SET. LOOK FOR SAVED SLOTS.
C
```



```
C              IS SHIP A GENERAL CARGO SHIP?  ARE VACATED SLOTS FOR
C              SLOTS?
     IF(ISTYP.NE.1) GOTO 600
     IF((LOCH(LSLOT1).EQ.2).OR.(LOCH(LSLOT1).EQ.4)) GOTO 280
     II=1
     NSLOT=LSLOT1
     GOTO 300
 280 IF(LSLOT2.EQ.0) GOTO 600
     IF((LOCH(LSLOT2).EQ.2).OR.(LOCH(LSLOT2).EQ.4))GOTO 600
     II=-1
     NSLOT=LSLOT2
C
C              IS ADJACENT SLOT SAVED?
C
 300 NSAVE=NSLOT-II
     NSTATE=NHATSS(NSAVE)
     I=NSAVE
     GOTO(41,310,310,310,310,310,320,320,310,310,320,320,41,41),NSTATE
C              SLOT IS NOT SAVED.  TRY OTHER ADJACENT SLOT.
 310 IF(II.EQ.-1) GOTO 600
     GOTO 280
C              SLOT IS SAVED.  FIND CRAFT, NUMBER OF SLOTS TO BLOCK AND
C              TO LOAD.
C
 320 KSAVE=NHATNO(NSAVE)
     JCRAFT=NHATNO(KSAVE)
     IF(NHATSS(NSAVE).NE.7) GOTO 330
     JCRAFT=NHATNO(NSAVE)
     KSAVE=NSAVE
 330 JCRTYP=IDCRAF(JCRAFT)
     NHATBL=MULHAT(JCRTYP)/10
     NHATLD=MULHAT(JCRTYP)-NHATBL*10
C
C              FIND NUMBER OF SLOTS ALREADY SAVED.
C
     ISAVED=1
 340 NSAVE=NSAVE-II
     IF(NSAVE.LE.0) GOTO 370
     IF(NSHPHS(NSAVE).NE.NSHPHS(ISLOT)) GOTO 370
     NSTATE=NHATSS(NSAVE)
C              IS NEXT ADJACENT SLOT SAVED?
     GOTO(370,370,370,370,370,370,350,360,370,370,360,360,370,370),
    .NSTATE
C              SLOT IS SAVED.  FOR THE SAME CRAFT?
 350 IF(NHATNO(NSAVE).EQ.JCRAFT) GOTO 365
     GOTO 370
 360 KSLOT=NHATNO(NSAVE)
     IF(NHATNO(KSLOT).NE.JCRAFT) GOTO 370
C              SLOT IS SAVED FOR THE SAME CRAFT.
 365 ISAVED=ISAVED+1
     GOTO 340
C
C              ALL SAVED SLOTS FOUND.  SAVE ANOTHER SLOT.
C
 370 IF(NHATSS(NSLOT).NE.2) GOTO 376
     NHATSS(NSLOT)=11
```

```
      NHATNO(NSLOT)=KSAVE
      GOTO 400
  380 IF(NHATSS(NSLOT).NE.4) GOTO 390
      NHATSS(NSLOT)=12
      NHATNO(NSLOT)=KSAVE
      GOTO 400
  390 IF(NHATSS(NSLOT).NE.4) GOTO 310
      NHATSS(NSLOT)=8
      NHATNO(NSLOT)=KSAVE
      ICLKEL=NCLKEL+NELEMT(3)+NSLOT
      NHSCUM(NSLOT,2)=NHSCUM(NSLOT,2)+MTIME+NCLOCK(ICLKEL)
      NCLOCK(ICLKEL)=-MTIME
      NEVTYP(ICLKEL)=0
  400 IF(NSLOT.EQ.LSLOT2) LSLOT=0
      WRITE(NTAPE,410) NSLOT,KSAVE,NHATSS(NSLOT)
  410 FORMAT(1X, 4HSLOT,I4,28HSAVED FOR BLOCKING FROM SLOT,I3,13H.  NEW
     .STATE=,I3)
      ISAVED=ISAVED+1
C
C           ENOUGH SLOTS SAVED?
C
      IF(ISAVED.EQ.NHATBL) GOTO 450
C           CHECK FOR END SLOT.
      IF(( LOCHS(NSLOT).NE.2).AND.( LOCHS(NSLOT).NE.4)) GOTO 420
C           END SLOT.
      IF(NHATLC.GT.1) GOTO 310
      GOTO 450
C
C           TRY TO SAVE ANOTHER SLOT.
C
  420 NSLOT=NSLOT+1
      GOTO 370
C
C           SAVED CRAFT CAN BE ASSIGNED.
C
  450 LE=NELEMT(4)
      ITEMP=ISLOT
      ISLOT=KSAVE
      ICRAFT=JCRAFT
      DO 550 J=1,LE
      IF(NCHPHS(J).NE.NSEPHS(ISLOT)) GOTO 550
      IF(J.EQ.ISLOT) GOTO 520
      IF(NHATNO(J).NE.ISLOT) GOTO 550
C
C           RESET HATCH SLOT STATE OF SLOTS SAVED FOR BLOCKING.
C
      IF(NHATSS(J).NE.11) GOTO 460
      NHATSS(J)=6
      GOTO 500
  460 IF(NHATSS(J).NE.12) GOTO 470
      NHATSS(J)=4
      GOTO 500
  470 IF(NHATSS(J).NE.8) GOTO 550
      NHATSS(J)=9
      ICLKEL=NCLKEL+NELEMT(3)+J
      NHSCUM(J,5)=NHSCUM(J,5)+MTIME+NCLOCK(ICLKEL)
      NCLOCK(ICLKEL)=-MTIME
      NEVTYP(ICLKEL)=0
  500 WRITE(NTAPE,510) J,ICRAFT,ISLOT
  510 FORMAT(1X, 4HSLOT,I5,18H  BLOCKED  BY CRAFT,I7, 9H  AT SLOT,I4)
      GOTO 550
C
C           ASSIGN CRAFT
C
  520 NHATSS(ISLOT)=10
      ICLKEL=NCLKEL+NELEMT(3)+ISLOT
      NHSCUM(ISLOT,5)=NHSCUM(ISLOT,5)+MTIME+NCLOCK(ICLKEL)
      NCLOCK(ICLKEL)=-MTIME
      NEVTYP(ICLKEL)=0
      WRITE(NTAPE,530) ICRAFT,ISLOT
  530 FORMAT(1X,11HSAVED CRAFT,I5,18H  ASSIGNED  TO SLOT,I5)
  550 CONTINUE
C
C           LOAD CRAFT
C
      CALL LOADER
      ISLOT=ITEMP
      GOTO 310
C
C           FIND NEW CRAFT FROM QUEUE FOR ANY VACATED SLOTS.
C
  600 CALL HSSORT
      CALL CHATSL
 1000 IF(KFLAG.EQ.1) CALL MINCLK
      RETURN
      END
```

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      EVENT4                DATE = 78326            13/39/03

      SUBROUTINE EVENT4
C
C           EVENT 4-- CRAFT ARRIVES AT LUS QUEU.
C           PLACES CRAFT IN QUEUE AND ASSIGNS IT TO AN LUS, IF
C           APPROPRIATE.
C
C           ALTERNATE ENTRY--CLUSSL ASSIGNS ALL CRAFT IN QUEUE TO AN
C           LUS, IF ANY.
C
C           CALLED FROM EVENT 3 AND - NEW CRAFT OR TRUCK ASSIGNMENT-.
C
C*****
C
      COMMON/A01/NCLOCK(100),NEVTYP(100),NOPEL(100),NELEMT(6),NCODE(20),
     .          NCLKEL,NLSTEL,MTIME,IFVTYP,IELEMT,IACTEL,INTCUM,INTPER,
     .LPTIME,LOTIME,NPRINT,NTAPE,NCARD,NTAPE1,NTAPE2,ICOUT,NTAPE3
C
      COMMON/A02/CARGWT(40),CARGVL(40),CARGCT(40),NCARHL(40),NCGTAG(40)
C
      COMMON/A03/CRAFWT(10),CRAFVL(10),CRAFSP(10,4),CRAFHT(10),NCRAFM(10
     .),MULHAT(10),NCCITM(10,40),NFILE(10),CRAFFS(10)
C
      COMMON/A04/TRUKWT(10),TRUKVL(10),TRUKSP(10,2),NTCITM(10,40),NPRTRK
     .(10,13),NPRTCG(30),MHEPRY(10,10,13),MHFTRK(30),LDGTTM(13,15,10),LD
     .TCTM(13,15,10),
     .          NPRCAR,IPRTKK,ITRUCK,NTRUKQ,NTRKPR
C
      COMMON/A05/NESSHP( 5),NCHSHF( 5),IDSHIP( 5),NSHPHS(20),IDHSLT(20),
     .NCHCAR(20),LSCHS(20),NHATSS(20),NSTYP(20),NHATNO(20),IDCARH(20),NS
     .FROM(20),NSTINE(20),NHATIX(100),NDCB(100),NACCES(100),NTOTAL(100),
     .NHTTAF(100,40),NSSSI(5),
     .          ICHCCR,LINDEX
C
      COMMON/A06/NCRTYP(10),NTKTYP(10),NLSTYP(15),NMHTYP(15,3),IDCRAF(30
     .),IDTRUK(30),IDLUS(30),IDSDVH(20),
     .          NCARTP,NCRFTP,NTRKTP,NLUSTP,NMHFTP,NHTSTP,NCARHT,NMHEPL
     .,NLUS,NSI,NTACTF
C
      COMMON/A07/DIST( 5),CAPST(3),ACAPST(3),LUSCRF(30),LUSTRK(30),LUSMH
     .F(30),LUSLOC(15),LUSSIT(15),LDCGTM(13,15,10),LDCTTM(13,15,10)
C
      COMMON/A08/LCRCAR(30,40),LTKCAR(30,40),LSTCAR(3,40)
C
      COMMON/A12/LUSQUE(30),NPRCCC(30),NPRLUS(15,10,13),NPRMHF(15,10,13)
     .,LUSLIS(16),LUSFTM(10,15),LUSSDT(10,15),
     .          LUSCRC,NLUSPR,LUSOPN
C
      COMMON/A13/NCRCUM(30,15),NTKCUM(30,9),MHECYC(15,3,2),MHECAR(15,3,
     .40),MHECUM(15,3, 4),LUSUSE(30,10),LUSCUM(30,2),NSTCUM(2,40),NHSCUM
     .(20,7),NHSCRF(20,10),NTRAFF(2),NCRCAF(30,40),INDCYC(30,2),KSTAT(30
     .,4,2),CSTAT(30,4,3)
C*****
      INTEGER*2NEVTYP,       NOPEL ,       NELEMT,       NCODE        A1
      INTEGER*2NCARHL,       NCGTAG                                   A2
      INTEGER*2NCRAFM,       MULHAT,       NCCITM,       NFILE        A3
      INTEGER*2NTCITM,       NPRTRK,       NPRTCG,       MHEPRY       A4
      INTEGER*2MHFTRK,       LDGTTM,       LDTCTM                     A4
      INTEGER*2NESSHP,       NCHSHF,       IDSHIP,       NSHPHS       A5
      INTEGER*2IDHSLT,       NCHCAR,       LSCHS ,       NHATSS       A5
      INTEGER*2NSTYP ,       NHATNO,       IDCARH,       NSFROM       A5
      INTEGER*2NSTINE,       NHATIX,       NDCB  ,       NACCES       A5
      INTEGER*2NTOTAL,       NHTTAF,       NSSSI                      A5
      INTEGER*2NCRTYP,       NTKTYP,       NLSTYP,       NMHTYP       A6
      INTEGER*2IDCRAF,       IDTRUK,       IDLUS ,       IDSDVH       A6
      INTEGER*2LUSCRF,       LUSTRK,       LUSMHF,       LUSLOC       A7
      INTEGER*2LUSSIT,       LDCGTM,       LDCTTM                     A7
      INTEGER*2LCRCAR,       LTKCAR,       LSTCAR                     A8
      INTEGER*2LUSQUE,       NPRCCC,       NPRLUS,       NPRMHF       A12
      INTEGER*2LUSLIS,       LUSFTM,       LUSSDT                     A12
C
C           PLACE ARRIVING CRAFT IN QUEUE.
C
      NCLOCK(IACTEL)=-NCLOCK(IACTEL)
C           SET NUMBER OF CRAFT IN LUS QUEUE.
      JFLAG=0
      LUSCRQ=LUSCRQ+1
      LUSQUE(LUSCRQ)=IACTEL
      NUMBER=LUSCRQ
      WRITE(NTAPE,2) IACTEL,NOPEL(IELEMT)
    2 FORMAT(1X,5HCRAFT,I4,22H  ARRIVES AT LUS QUEUE,I4,1H.)
      GO TO 30
C
C           ENTRY TO SELECT ALL CRAFT IN LUS QUEUE FOR OPEN LUS-S.
C
      ENTRY CLUSSL
      JFLAG=0
      IF(LUSCRQ.NE.0) GO TO 10
C           LUS QUEUE IS EMPTY.
    4 WRITE(NTAPE,5)
    5 FORMAT(1X,19HLUS QUEUE IS EMPTY.)
      GO TO 1000
   10 NUMBER=1
C
C       ANY UNOCCUPIED LUS-S?
C
   30 IF(LUSOPN.NE.0) GO TO 35
   31 WRITE(NTAPE,32)
   32 FORMAT(1X,23HALL LUS-S ARE OCCUPIED.)
      GO TO 1000
   35 CONTINUE
C
C           LOOP THRU LUS PRIORITIES
C
      DO 500 J=1,NLUSPR
      IFLAG=0
C
C           LOOP THRU LIST OF CRAFT IN LUS QUEUE.
C
      L4=LUSCRQ
      DO 400 I=NUMBER,L4
C
C     IS THERE A CRAFT AT THIS POSITION IN QUEUE?
```

```
C
      IF(LUSQUE(1).EQ.0) GO TO 400
C
C             IS CRAFT-LUS-MHE-CARGO PRIORITY NUMBER 1?
      ICRAFT=LUSQUE(1)
      ICRTYP=ICCRAF(ICRAFT)
      ICARTP=NPRCCC(ICRAFT)
      ITAGTP=NCGTAG(ICARTP)
      IF(MPNLUS(J,ICRTYP,ITAGTP).EQ.0) GO TO 400
      IFLAG=1
      IF(J.EQ.1) GO TO 80
C
C             FOR OTHER THAN FIRST PRIORITY ASSIGNMENTS, A SEA WALL MAY
C             ONLY BE USED FOR A BARGE IF A LASH IS IN THE SYSTEM. CHECK
C             CONDITIONS.
C
      ILUSTP=NPRLUS(J,ICRTYP,ITAGTP)
      IF(LUSSTT(ILUSTP).NE.1) GO TO 80
C
C             LUS IS A SEA WALL. LASH IN SYSTEM?
C
      L1=NCLKEL+1
      L2=NCLKEL+NELEPT(3)
C             LOOP THRU SHIP CLOCK TO FIND A LASH.
      DO 60 K=L1,L2
      IF(NEVTYP(K).NE.0) GO TO 60
      L=K-NCLKEL
      IF(IDSHIP(L).EQ.3) GO TO 400
   60 CONTINUE
C
C             NO LASH IN SYSTEM
C
C
C             IS AN LUS OF CURRENT TYPE AVAILABLE?
C
   80 ILUSTP=NPRLUS(J,ICRTYP,ITAGTP)
      IF(LUSLIS(ILUSTP).EQ.0) GO TO 400
      ILUS=LUSLIS(ILUSTP)
C
C             DETERMINE MHE REQUIRED.
C
      IMHETP=NPRMHE(J,ICRTYP,ITAGTP)
      IMHEPL=LUSLOC(ILUSTP)
      IF(IMHETP.EQ.0) GO TO 100
C
C             MOBILE MHE REQUIRED. IS IT IN POOL?
C
      IF(NMHTYP(IMHETP,IMHEPL).EQ.0) GO TO 400
C
C             MHE IS AVAILABLE. CHECK FOR A TRUCK ASSIGNMENT.
C
  100 IPRTRK=0
      ITRUCK=0
      IF(IMHEPL.EQ.3) GO TO 200
      IF(NCRAFM(ICRTYP).EQ.6) GO TO 200
      IF(CARGCT(ICARTP).GT..1) GO TO 200
```



```
C
C             SELECT A TRUCK, IF ANY.
C
      KPRCAR=ICART
      CALL TRKSEL
C
C             TRUCK AVAILABLE?
C
      IF(ITRUCK.EQ.0) GOTO 150
C
C             ASSIGN THE TRUCK.
C
      ISUB1=NELEMT(1)+ITRUCK
      NCYCLE=NTKCUM(ITRUCK,1)+1
      ISUB2=MTIME+NCLOCK(ISUB1)
      NTKCUM(ITRUCK,2)=NTKCUM(ITRUCK,2) +ISUB2
      WRITE(NTAPE2,258) NCODE(5),NCYCLE,ITRUCK,MTIME,ISUB2
      NCLOCK(ISUB1)=-1
      NEVTYP(ISUB1)=0
      LUSTRK(ILUS)=ITRUCK
      NOPEL(ISUB1)=ILUS
      NTRUKQ=NTRUKQ-1
      GO TO 200
C
C             NO TRUCK AVAILABLE. IS TRUCK REQUIRED?
C
  150 IF(NCARHL(KPRCAR).LE.2) GO TO 400
C
C             CHECK TONNAGE AT STORAGE AREA.
C
      IF(ACAPST(IMHEPL).LT.CAPST(IMHEPL)) GOTO 200
      WRITE(NTAPE,160) IMHEPL,ACAPST(IMHEPL)
  160 FORMAT(1X,4HAREA,I3,22H  EXCEEDS TONNAGE WITH,F10.2,7H  TONS.)
      GOTO 400
C
C             ASSIGN MHE, IF ANY, TO LUS.
C
  200 IF(IMHETP.EQ.0) GO TO 250
      LUSMHE(ILUS)=IMHETP
      NMHTYP(IMHETP,IMHEPL)=NMHTYP(IMHETP,IMHEPL)-1
C
C             ASSIGN CRAFT TO LUS
C
  250 ITIME=0
      ITEMP=NOPEL(ICRAFT)
      DIS=0.
      GOTO (251,252,253),ITEMP
C
C             CRAFT MOVES FROM BEACH Q--BEACH.
C
  251 ITIME=ITIME+((5280.*DIST(4))/(1.1515*CRAFSP(ICRTYP,4)))+.5
      IF(IMHEPL.EQ.1) GOTO 255
C
C             CRAFT MOVES FROM BEACH--ISS Q.
C
      DIS=DIS+DIST(5)
```

```
C
C          CRAFT MOVES FROM ISS Q--ISS.
C
  252 DIS=DIS+DIST(7)
      IF(IMHEFL.EQ.2) GOTO 254
C
C          CRAFT MOVES FROM DEPOT Q--DEPOT.
C
      DIS=DIS+DIST(6)
C
C          CRAFT MOVES FROM DEPOT Q--DEPOT.
C
  253 DIS=DIS+DIST(8)
  254 ITIME=ITIME+((3600.*DIS)/CRAFSP(ICRTYP,2))+.5
  255 NCRCUM(ICRAFT,10)=NCRCUM(ICRAFT,10)+LUSBTM(ICRTYP,ILUSTP)
      NCRCUM(ICRAFT, 9)=NCRCUM(ICRAFT, 9)+ITIME
      NCRCUM(ICRAFT, 8)=NCRCUM(ICRAFT, 8)+MTIME+NCLOCK(ICRAFT)
      NCYCLE=NCRCUM(ICRAFT,1)+1
      JTEMP=MTIME+NCLOCK(ICRAFT)
      WRITE(NTAPE2,258) ACODE(3),NCYCLE,ICRAFT,MTIME,ITEMP,ILUS,JTEMP,
     .ITIME,LUSBTM(ICRTYP,ILUSTP)
  258 FORMAT(1X,I2,11I7)
      WRITE(NTAPE2,259) (LCRCAR(ICRAFT,L),L=1,NCARTP)
  259 FORMAT(1X,I1,39I3)
      NCLOCK(ICRAFT)=MTIME+ITIME+LUSBTM(ICRTYP,ILUSTP)
      IF(ITRUCK.NE.0) NTKCUM(ITRUCK,4)=NTKCUM(ITRUCK,4)+NCLOCK(ICRAFT)
     .-MTIME
      LUSUSE(ILUS,ICRTYP)=LUSUSE(ILUS,ICRTYP)+1
      LUSCUM(ILUS,2)=LUSCUM(ILUS,2)+ITIME
      NEVTYP(ICRAFT)=4
      NOPEL(ICRAFT)=ILUS
      LUSCRF(ILUS)=-ICRAFT
      LUSQUE(I)=0
      LUSCRQ=LUSCRQ-1
      JFLAG=1
      OTIME=ITIME/3600.
      OTIME1=NCLOCK(ICRAFT)/3600.
      WRITE(NTAPE,260)ICRAFT,ILUS,IMHEPL,OTIME1,OTIME,J,IMHETP,ITRUCK,IP
     .RTRK
  260 FORMAT(1X,5HCRAFT,I4,13H  SENT TO LUS,I4,5H  AT LOC.,I3,14H  TO AR
     .RIVE  AT,F8.2,11H  HOURS. TRAVEL=,F8.2,8H  HOURS./1X,8HPRIORITY,I4,
     .20H  ASSIGNMENT.  MHE TYPE,I4,
     .11H  TRUCK NO.,I4,17H  TRUCK PRIORITY=,I4)
      IFRTRK=0
C
C          UPDATE LIST OF AVAILABLE LUS AREAS.
C
      LUSOPN=LUSOPN-1
      LUSLTS(ILUSTP)=0
      IF(LUSOPN.EQ.0) GO TO 31
      DO 270 K=1,NLUS
      IF((LUSCRF(K).NE.0).OR.(IDLUS(K).NE.ILUSTP)) GO TO 270
      LUSLTS(ILUSTP)=K
      GO TO 280
  270 CONTINUE
C
```



```
C          ADDITION CRAFT ASSIGNMENT POSSIBLE?
C
  280 IF(IEVTYP.EQ.6) GOTO 1000
      IF(LUSCRQ.EQ.0) GO TO 4
  400 CONTINUE
C          ANY MORE COMPATIBLE PRIORITIES*
      IF(IFLAG.EQ.0) GO TO 1000
  500 CONTINUE
C
C          UPDATE LUS QUEUE LIST.
C
 1000 IF( JFLAG.EQ.0) GO TO 2000
      L2=NELEMT(1)
      ITEMP=0
      DO 1150 I=1,L2
      IF(LUSQUE(I).EQ.0) GO TO 1150
      ITEMP=ITEMP+1
      LUSQUE(ITEMP)=LUSQUE(I)
      IF(ITEMP.EQ.LUSCRQ) GO TO 2000
 1150 CONTINUE
 2000 RETURN
      END
```

```
      SUBROUTINE EVENT4
C
C           EVENT 4--CRAFT ARRIVES AT LUS EVENT PROCESSOR.
C           CRAFT AT LUS IS UNLOADED UNTIL--
C           1.  ASSIGNED TRUCK IS FULL, OR
C           2.  1 ITEM IS UNLOADED (IF A TRUCK IS UNAVAILABLE), OR
C           3.  CRAFT IS EMPTY, OR
C           4. CURRENT MHE CANNOT UNLOAD REMAINING CARGO.
C           GENERATES EITHER--EVENT 5-CRAFT LEFT AT LUS, OR EVENT 6-
C           CRAFT LEAVES LUS.
C
C*****
C
      COMMON/A01/MCLOCK(100),NEVTYP(100),NOPEL(100),NELEMT(6),NCODE(20),
     .          NCLKEL,NLSTEL,MTIME,IEVTYP,IELEMT,IACTEL,INTCUM,INTPER,
     .LPTIME,LCTIME,NPRINT,NTAPE,NCARD,NTAPE1,NTAPE2,ICOUT,NTAPE3
C
      COMMON/A02/CARGWT(40),CARGVL(40),CARGCT(40),NCARHL(40),NCGTAG(40)
C
      COMMON/A03/CRAFWT(10),CRAFVL(10),CRAFSP(10,4),CRAFHT(10),NCRAFM(10
     .),MULHAT(10),NCCITM(10,40),NFILE(10),CRAFFS(10)
C
      COMMON/A04/TRUKWT(10),TRUKVL(10),TRUKSP(10,2),NTCITM(10,40),NPRTRK
     .(10,13),NPRTCG(30),MHEPRY(10,10,13),MHETRK(30),LDGTTM(13,15,10),LD
     .TGTM(13,15,10),
     .          KPFCAR,IPRTRK,ITRUCK,NTRUKG,NTRKPR
C
      COMMON/A05/NSSHP( 5),NCHSHP( 5),IDSHIP( 5),NSHPHS(20),IDHSLT(20),
     .NCHCCK(20),LCCFS(20),NHATSS(20),NSTYP(20),NHATNO(20),IDCARH(20),NS
     .B00M(20),NSTINF(20),NHATIX(100),NDCR(100),NACCES(100),NTOTAL(100),
     .NHTTAR(10,40),NSSSI(5),
     .          ICHCOR,LINDEX
C
      COMMON/A06/NCRTYP(10),NTKTYP(10),NLSTYP(15),NMHTYP(15,3),IDCRAF(30
     .),IDTRUK(30),IFLUS(30),IFSDVH(20),
     .          NCARTF,NCRFTP,NTRKTP,NLUSTP,NMHETP,NHTSTP,NCARHT,NMHEPL
     .,NLUS,NSI,NTACTP
C
      COMMON/A07/DIST( 9),CAPST(3),ACAPST(3),LUSCRF(30),LUSTRK(30),LUSMH
     .E(30),LUSLOC(15),LUSSTT(15),LDCGTM(13,15,10),LDCTTM(13,15,10)
C
      COMMON/A08/LCRCAR(30,40),LTKCAR(30,40),LSTCAR(3,40)
C
      COMMON/A09/LISTCR(30),LISTHS(24),NSORT(30),NPRCAR(20),NPRCHC(10,10
     .,15),
     .          NLISCR,NLISHS,ISLOT,ICRAFT
C
      COMMON/A10/MCRTM(10,10),LOADTM(10,10,13),
     .NPDT,NDECKE,NRTM00,NRTM15,NSMT,NSIMT,NHFLOD,NSIWT
C
      COMMON/A11/NCITEM(40),NPLAT(20),
     .          ITIME,LCTIME,JSLOT,JHATCH,WEIGHT,VOLUME,L1,L5,CCWT,CCVL
     .          ,INDEX,NCONTR,CCFS,FLCOR
C
      COMMON/A12/LUSCRE(30),NPRCC(30),NPRLUS(15,10,13),NPRMHF(15,10,13)
     .,LUSLIS(16),LUSBTM(10,15),LUSSDT(10,15),
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     .          LUSCRS,NLUSPR,LUSCRN
C
      COMMON/A13/CRCUM(30,15),NTKCUM(30,9),MHECYC(15,3,2),MHECAR(15,5,
     .40),MHECUM(15,5, 4),LUSUTL(15,10),LUSCUM(30,2),STCUM(2,40),HSCUM
     .(20,7),LUSCRE(20,10),NTRAFF(2),NCRCAR(30,40),IMECYC(30,2),KSTAT(50
     .,4,2),CSTAT(5,4,5)
C*****
      INTEGER*2NEVTYP,     NOPEL ,      NELEMT,      NCODE        A1
      INTEGER*2NCARHL,     NCGTAG                                 A2
      INTEGER*2NCRAFM,     MULHAT,      NCCITM,      NFILE        A3
      INTEGER*2NTCITM,     NPRTRK,      NPRTCG,      MHEPRY       A4
      INTEGER*2MHETRK,     LDGTTM,      LDTGTM                    A4
      INTEGER*2NSSSHP,     NCHSHP,      IDSHIP,      NSHPHS       A5
      INTEGER*2IDHSLT,     NCHCCK,      LCCHS ,      NHATSS       A5
      INTEGER*2NSTYP ,     NHATNO,      IDCARH,      NSB00M       A5
      INTEGER*2NSTINF,     NHATIX,      NDCR ,       NACCES       A5
      INTEGER*2NTOTAL,     NHTTAR,      NSSSI                     A5
      INTEGER*2NCRTYP,     NTKTYP,      NLSTYP,      NMHTYP       A6
      INTEGER*2IDCRAF,     IDTRUK,      IFLUS ,      IFSDVH       A6
      INTEGER*2LUSCRF,     LUSTRK,      LUSMHE,      LUSLOC       A7
      INTEGER*2LUSSTT,     LDCGTM,      LDCTTM                    A7
      INTEGER*2LCRCAR,     LTKCAR,      LSTCAR                    A8
      INTEGER*2LISTCR,     LISTHS,      NSORT ,      NPRCAR       A9
      INTEGER*2NPRCHC                                             A9
      INTEGER*2MCOPTM,     LOADTM                                 A10
      INTEGER*2NCITEM,     NPLAT                                  A11
      INTEGER*2LUSCRE,     NPRCCG,      NPRLUS,      NPRMHF       A12
      INTEGER*2LUSLIS,     LUSBTM,      LUSSDT                    A12
      IF(IEVTYP.EQ.10) GO TO 1700
      IF(IEVTYP.NE.4) GOTO 7
      WRITE(NTAPE,2)IACTEL,NOPEL(IACTEL)
    2 FORMAT(1X,5HCRAFT,I4,16H   ARRIVES AT LUS,I4)
      ILUS=NOPEL(IACTEL)
      LUSCRF(ILUS)=-LUSCRF(ILUS)
    7 IFLAG=0
      LTIME=0
      NCNTOT=0
      NCONTR=0
      DIS=0
      CTWT=0
      CTVL=0
      NCONCG=0
      ICONTP=0
      FACTOR=1.
      IF(IEVTYP.NE.11) GO TO 5
C
C           SET SPECIAL PARAMETERS FOR BARGE.
C
      ILUS=NHAINC(IACTEL)
      ICRTYP=NCRFTP+1
      INDEX=NOPEL(IELEMT)
      GO TO 9
C
C           PARAMETERS FOR CRAFT
C
    5 ILUS=NOPEL(IACTEL)
```

```
      ICRTYP=ICCRAF(IACTEL)
C
C           CHECK FOR INITIAL RETROGRADE.
C
      IF(LCRCAR(IACTEL,NCARTP+1).EQ.0) GO TO 9
C
C           CRAFT MUST RETROGRADE CONTAINERS.
C
C           FIND TOTAL NUMBER OF CONTAINERS ON CRAFT.
C
      L2=NCARTP+1
      DO 5 J=1,L2
      K=L2+1-J
      IF(CARGCT(K).NE.-1.) GO TO 5
      IF(ICONTP.EQ.0) ICONTP=K
      NCONCC=NCONCC+LCRCAR(IACTEL,K)
    5 CONTINUE
      NCONCC=NCONCC-LCRCAR(IACTEL,NCARTP+1)
      NCNTOT=LCRCAR(IACTEL,NCARTP+1)
      IF(NCCITM(ICRTYP,ICONTP).GT.0) NCNTOT=NCCITM(ICRTYP,ICONTP)
    9 ILUSTP=IPLUS(ILUS)
      IMHEPL=LUSLOC(ILUSTP)
      IMHETP=LUSMHE(ILUS)
      ITRUCK=LUSTRK(ILUS)
C
C           DETERMINE MHE TYPE SUBSCRIPT
C
      ITEMP=LUSSTT(ILUSTP)
      GOTO(11,12,13,14,1700),ITEMP
C
C           SEA WALL
C
   11 MHESUB=NMHETP+1
      GOTO 20
C
C           FIXED BEACH
C
   12 IF(IMHETP.NE.0) GOTO 15
      MHESUB= NMHETP+2
      GOTO 20
C
C           MOBILE MHE
C
   13 IF(IMHETP.EQ.0) GOTO 14
   15 MHESUB=IMHETP
      GOTO 20
C
C           NO MHE--HELO. PAD OR RO/RO SITUATION
C
   14 MHESUB=NMHETP+4
   20 IF(ITRUCK.NE.0)ITKTYP=IDTRUK(ITRUCK)
      IF(IEVTYP.NE.11) GOTO 23
      DO 21 I=1,NCARTP
      IF(NHITAB(INDEX,I).GT.0) GOTO 22
   21 CONTINUE
   22 L1=I
```



```
      GOTO 24
   23 L1=NPRECC(IACTEL)
C
C           CHECK EMPTY CONTAINER RETROGRADE.
C
      IF(IEVTYP.EQ.16) GO TO 1900
C
C           LOOP THRU CARGO MODULES.
C
   24 DO 900 I=L1,NCARTP
      ITAGTP=NCSTAT(I)
C
C           BY-PASS COMPATIBILITY TEST FOR HIGHEST PRIORITY CARGO
C           MODULE.
C
      IF(I.EQ.L1) GOTO 50
C
C           CARGO MODULE ON CRAFT?
C
      IF(IEVTYP.NE.11) GO TO 25
      IF(NHITAB(INDEX,I).EQ.0) GO TO 900
      GO TO 28
   25 IF(LCRCAR(IACTEL,I).EQ.0) GO TO 900
C           RESET HIGHEST CARGO IF APPROPRIATE.
      IF(NPRECC(IACTEL).EQ.0)NPRECC(IACTEL)=I
C
C           IS LUS A SEA WALL OR HELO. PAD?
C
   28 IF((LUSSTT(ILUSTP).EQ.1).OR.(LUSSTT(ILUSTP).EQ.4)) GO TO 50
C
C           ACCEPTABLE MHE FOR CURRENT CARGO?
C
      ITEST=ILUSTP
   30 DO 40 J=1,NLUSER
      IF((NPRLUS(J,ICRTYP,ITAGTP).EQ.ITEST).AND.(PERMHE(J,ICRTYP,ITAGTP)
     *.EQ.IMHETP)) GOTO 50
   40 CONTINUE
      IF(ITEST.NE.ILUSTP)GO TO 890
      IF(LUSSTT(ILUSTP).NE.2) GO TO 890
C
C           LUS TYPE IS FIXED BEACH--TRY MHE TYPES FOR MOBILE BEACH
C           TYPE ALSO. DETERMINE BEACH TYPE NUMBER.
C
      DO 45 K=1,NLUSTP
      IF((LUSLOC(K).EQ.IMHEPL).AND.(LUSSTT(K).EQ.3)) GOTO 46
   45 CONTINUE
      GO TO 890
   46 ITEST=K
      GO TO 30
C
C           MHE ACCEPTABLE. IS CARGO SD VEHICLE OR IS LUS AT DEPOT?
C
   50 IF((LUSLOC(ILUSTP).EQ.3).OR.(CARGCT(I).GT..1)) GO TO 700
C
C           IS A TRUCK PRESENT?
C
```

```
      IF(ITRUCK.EQ.0) GO TO 1100
C
C              TRUCK AVAILABLE--UNLOAD ITEMS CRAFT-TRUCK.
C
      NUMBER=LCRCAR(IACTEL,I)
      IF(IEVTYP.EQ.11)NUMBER=NHTTAB(INDEX,I)
      ITEMP=(TRUKWT(ITKTYP)-CTWT)/CARGWT(I)
      JTEMP=(TRUKVL(ITKTYP)-CTVL)/CARGVL(I)
      IF(NTCITM(ITKTYP,I).GE.0) GO TO 60
      KTEMP=JTEMP
      GO TO 70
   60 KTEMP=NTCITM(ITKTYP,I)-NCONTR
   70 NUMBER=MIN(NUMBER,ITEMP,JTEMP,KTEMP)
      IF(NUMBER.LE.0)GO TO 900
C
C              NUMBER OF ITEMS OF THIS TYPE THAT CAN BE LOADED IS KNOWN.
C
C              UPDATE CURRENT TRUCK CARGO
      CTWT=CTWT+CARGWT(I)*NUMBER
      CTVL=CTVL+CARGVL(I)*NUMBER
      NCONTR=NCONTR+NUMBER
      IF(IEVTYP.NE. 11)GO TO 75
      NHTTAB(INDEX,I)=NHTTAB(INDEX,I)-NUMBER
      NTOTAL(INDEX)=NTOTAL(INDEX)-NUMBER
      GO TO 78
   75 LCRCAR(IACTEL,I)=LCRCAR(IACTEL,I)-NUMBER
      IF((NPRCCG(IACTEL).EQ.I).AND.(LCRCAR(IACTEL,I).EQ.0))NPRCCG(IACTEL
     .)=0
   78 LTKCAR(ITRUCK,I)=LTKCAR(ITRUCK,I)+NUMBER
C              UPDATE TIME
      IF(LDCTIM(ITAGTP,MHESUB,ICRTYP).LT.0) GOTO 80
   79 LTIME=LTIME+LDCTIM(ITAGTP,MHESUB,ICRTYP)*NUMBER
C
C              TEST FOR RETROGRADE CYCLE.
C
 3001 IF(NRTCT.EQ.0) GOTO 3100
      IF(NCONCG.EQ.1) GOTO 3000
      IF((NCNTOT-NCONCG).GE.(NFILE(ICRTYP)-1)) GOTO 3000
      GOTO 3100
C
C              RETROGRADE OCCURS
C
 3000 IF(LUSLOC(ILUSTP).EQ.3) GOTO 3002
      IF(LDCTIM(ITAGTP,MHESUB,ICRTYP).LT.0) GOTO 80
      LTIME=LTIME+LDCTIM(NTAGTP,MHESUB,ICRTYP)*NUMBER
      GOTO 3003
C
C              RETROGRADE AT DESTINATION.
C
 3002 IF(LDCGTM(NTAGTP,MHESUB,ICRTYP).LT.0) GOTO 80
      LTIME=LTIME+LDCGTM(NTAGTP,MHESUB,ICRTYP)*NUMBER
 3003 OTIME=LTIME/3600.
      WRITE(NTAPE,1950) NUMBER,ITRUCK,IACTEL,OTIME
   31 NCONCG=NCONCG-NUMBER
      IF(MHESUP.GT.NMHETP) GOTO 31
      MHECAR(MHESUP,IMHEPL,I)=MHECAR(MHESUP,IMHEPL,I)+NUMBER
```



```
      GOTO 90
   80 WRITE(NPRINT,1800) I,MHESUB,ICRTYP
   90 IF(LUSLOC(ILUSTP).EQ.3) GOTO 900
C
C     IS TRUCK FULL?
C
      IF(NTCITM(ITKTYP,I).LE.0) GO TO 905
      IF(TRUKWT(ITKTYP).LT.(CTWT+CARGWT(NCARTP))) GO TO 920
      IF(TRUKVL(ITKTYP).LT.(CTVL+CARGVL(NCARTP))) GO TO 920
      IF(NTCITM(ITKTYP,I).LT.(NCONTR+1)) GOTO 920
      GO TO 900
C
C              SD VEHICLE AND LUS AT DEPOT.
C
C              DETERMINE UNLOAD TIME
  700 IF(LDCGTM(ITAGTP,MHESUB,ICRTYP).LT.0) GOTO 705
      IF(IEVTYP.EQ.11) GOTO 701
      NITEMS=LCRCAR(IACTEL,I)
      NUMBER=NITEMS
      GOTO 702
  701 NITEMS=NHTTAB(INDEX,I)
  702 LTIME=LTIME+LDCGTM(ITAGTP,MHESUB,ICRTYP)*NITEMS
      IF(MHESUB.GT.NMHETP) GOTO 707
      MHECAR(MHESUB,IMHEPL,I)=MHECAR(MHESUB,IMHEPL,I)+LCRCAR(IACTEL,I)
      GOTO 707
  705 WRITE(NPRINT,1800) I,MHESUB,ICRTYP
  707 IF(IEVTYP.EQ.11) GO TO 708
      IF(NPRCCG(IACTEL).EQ.I)NPRCCG(IACTEL)=0
C
C              IS LUS AT DEPOT?
C
      IF(LUSLOC(ILUSTP).EQ.3)GO TO 800
C
C              GENERATE AN SD VEHICLE EVENT.
C
  708 NLSTEL=NLSTEL+1
      NELEMT(5)=NELEMT(5)+1
      ISUB=NELEMT(5)
      IDSDVH(ISUB)=I
      NEVTYP(NLSTEL)=12
      IF(IEVTYP.NE.11) GO TO 709
      NOPEL(NLSTEL)=NHTTAB(INDEX,I)
      NHTTAB(INDEX,I) =0
      NTOTAL(INDEX)=NTOTAL(INDEX)-NOPEL(NLSTEL)
      GO TO 715
  709 NOPEL(NLSTEL)=LCRCAR(IACTEL,I)
      LCRCAR(IACTEL,I)=0
  715 IFLAG=1
      DIS=DIST(4)+DIST(8)
      IF(LUSLOC(ILUSTP).EQ.1)DIS=DIS+DIST(5)+DIST(7)
      NCLOCK(NLSTEL)=MTIME+LTIME+((3600.*DIS)/CARGCT(I))+.5
      NTRAFF(2)=NTRAFF(2)+NOPEL(NLSTEL)
      OTIME =(MTIME+LTIME)/3600.
      OTIME1=NCLOCK(NLSTEL)/3600.
      WRITE(NTAPE,710)OTIME,NOPEL(NLSTEL),I,OTIME1
  710 FORMAT(1X,2HAT,F8.2,19H  HOURS A CONVOY OF,I4,17H  SD VEH. OF TYPE
```

```
     *,I3,31H  LEAVES FOR DEPOT TO ARRIVE AT,F8.2,6H  HOURS.)
      GO TO 50C
C
C           LUS IS AT DEPOT.
C
  800 WRITE(NTAPE,810)LCRCAR(IACTEL,I),I
  810 FORMAT(1X,I4,21H  ITEMS OF CARGO TYPE,I4,20H  UNLOADED AT DEPOT.)
      LSTCAR(3,I)=LSTCAR(3,I)+LCRCAR(IACTEL,I)
      ACAPST(3)=ACAPST(3)+LCRCAR(IACTEL,I)*CARCWT(I)
      LCRCAR(IACTEL,I)=0
C
C           TEST FOR CONTAINER CARGO.
C
      IF(CARGCT(I).EQ.-1.000) GOTO 3001
      GO TO 200
C
C           UNACCEPTABLE MHE MESSAGE
C
  890 WRITE(NTAPE,895)IMHETP,I
  895 FORMAT(1X,8HMHE TYPE,I3,29H  UNACCEPTABLE FOR CARGO TYPE, I4)
  900 CONTINUE
      GO TO 950
C
C           TRUCK IS FULL.
C
  920 WRITE(NTAPE,930)
  930 FORMAT(1X,14HTRUCK IS FULL.)
  950 IF(ITRUCK.NE.0)WRITE(NTAPE,960)ITRUCK,(LTKCAR(ITRUCK,J),J=1,NCARTP
     *)
  960 FORMAT(1X,5HTRUCK,I4,13H  HAS CARGO--/1X,40I3)
      GOTO 1215
C
C           NO TRUCK AVAILABLE. IS A TRUCK REQUIRED?
C           YES--IF HVY CARGO,CONTAINERS, OR NSD VEHICLES.
C
 1100 WRITE(NTAPE,1105)
 1105 FORMAT(1X,17HNO TRUCK PRESENT.)
      IF((NCARPL(I).EQ.3).AND.(CARGCT(I).GT.-1.1)) GOTO 1200
C
C           TRUCK IS REQUIRED. LOADING CANNOT PROCEED.
C
      OTIME=(MTIME+LTIME)/3600.
      WRITE(NTAPE,1110)OTIME,I
 1110 FORMAT(1X,23HLOADING DISCONTINUED AT,F8.2,19H  DUE TO CARGO TYPE,I
     *4)
      NCLOCK(IELEMT)=MTIME+LTIME
      GO TO 1600
C
C           UNLOAD 1 ITEM CRAFT-GROUND.
C
 1200 IF(LDCGTM(ITAGTP,MHESUR,ICRTYP).LT.0) GOTO 1205
      LTIME=LTIME+LDCGTM(ITAGTP,MHESUR,ICRTYP)
      NSTCUM(IMHEPL,I)=NSTCUM(IMHEPL,I)+1
      IF(MHESUR.GT.NMHETP) GOTO 1207
      MHECAR(MHESUR,IMHEPL,I)=MHECAR(MHESUR,IMHEPL,I)+1
      GOTO 1207
```



```
 1205 WRITE(NERITE,1206) I,MHESUR,ICRTYP
 1207 IF(IEVTYP.NE.11) GO TO 1208
      NHITAF(INDEX,I)=NHITAL(INDEX,I)-1
      NTOTAL(INDEX)=NTOTAL(INDEX) -1
      GO TO 1209
 1208 LCRCAR(IACTEL,I)=LCRCAR(IACTEL,I)-1
 1209 LSTCAR(IMHEPL,I)=LSTCAR(IMHEPL,I)+1
      ACAPST(IMHEPL)=CARCWT(I)+ACAPST(IMHEPL)
      WRITE(NTAPE,1210)I,IMHEPL
 1210 FORMAT(1X,20H1 ITEM OF CARGO TYPE,I4,23H  MOVED TO STORAGE AREA,I4)
C
C           DETERMINE CURRENT HIGHEST PRIORITY CARGO TYPE ON CRAFT
C
      IF(LCRCAR(IACTEL,I).NE.0)GO TO 1400
 1215 IF(IEVTYP.EQ.11) GO TO 1400
      NPRCCG(IACTEL)=0
      DO 1220 J= 1,NCARTP
      IF(LCRCAR(IACTEL,J).GT.0) GO TO 1230
 1220 CONTINUE
      GO TO 1400
 1230 NPRCCG(IACTEL)=J
C
C     LOADING OPERATION COMPLETED.
C
 1400 LUSCUM(ILUS,1)=LUSCUM(ILUS,1)+LTIME
      IF(IEVTYP.EQ.11) GO TO 1402
      NCRCUM(IACTEL,11)=NCRCUM(IACTEL,11)+LTIME
      NCYCLE=NCRCUM(IACTEL,1)+1
 1402 IF(ITRUCK.EQ.0) GOTO 1405
      NTKCUM(ITRUCK,3)=NTKCUM(ITRUCK,3)+LTIME
      ISUB1=NTKCUM(ITRUCK,1)+1
      WRITE(NTAPE2,1810) NCODE(6),ISUB1,ITRUCK,MTIME,ILUS,LTIME
      WRITE(NTAPE2,1820) (LTKCAR(ITRUCK,I),I=1,NCARTP)
 1405 IF(MHESUB.LE.NMHETP) MHECUM(MHESUB,IMHEPL,1)=MHECUM(MHESUB,IMHEPL,
     *1)+LTIME
      NCLOCK(IELEMT)=MTIME+LTIME
C
C           IS CRAFT EMPTY?
C
      IF(IEVTYP.NE.11) GO TO 1410
      IF(NTOTAL(INDEX).NE.0) GO TO 1600
C
C           GENERATE EVENT 18- BARGE LEAVES SEA WALL.
C
      NEVTYP(IELEMT)=18
      GOTO 1415
 1410 IF(NPRCCG(IACTEL).NE.0) GO TO 1600
      IF(LCRCAR(IACTEL,NCARTP+1).GT.0) GO TO 1750
C
C           GENERATE EVENT 6--CRAFT LEAVES LUS.
C
 1414 NEVTYP(IELEMT)=6
 1415 WRITE(NTAPE2,1810) NCODE(4),NCYCLE,IACTEL,MTIME,ILUS,LTIME
      OTIME=NCLOCK(IELEMT)/3600.
      WRITE(NTAPE,1420)OTIME
 1420 FORMAT(1X,26HCRAFT EMPTY. WILL LEAVE AT,F8.2,6H  HOURS.)
```

```
      GO TO 2000
C
C           GENERATE EVENT 5--CRAFT LEFT AT LUS
 1600 NEVTYP(IELEMT)=5
      IF(IEVTYP.EQ.11) GO TO 1620
      WRITE(NTAPE2,1010) KCODE(4),KCYCLE,IACTEL,MTIME,ILUS,LTIME
      WRITE(NTAPE,1610)NPRCG(IACTEL)
 1610 FORMAT(1X,33HHIGHEST PRIORITY CARGO LEFT IS,I4)
      GO TO 2000
C
C           GENERATE EVENT 11--BARGE LEFT AT SEA WALL
 1620 NEVTYP(IELEMT)=11
      GO TO 2000
C
C           GENERATE EVENT 16--CRAFT LEFT FOR RETROGRADE ONLY.
 1650 NEVTYP(IELEMT)=16
      IF(IEVTYP.EQ.16) GOTO 2000
      NRET=NFILE(ICRTYP)-1
      IF(LCRCAR(IACTEL,NCARTP+1).LT.(NRET+1)) NRET=LCRCAR(IACTEL,NCARTP+
     .1)-1
      IF((NCCITM(ICRTYP,ICONTP).GT.0).AND.((NCNTOT-LCRCAR(IACTEL,NCARTP+
     .1)).LT.(NFILE(ICRTYP)-1))) NRET=0
      LCRCAR(IACTEL,NCARTP+1)=NRET
      IF(NRET.EQ.0) GOTO 1414
      GOTO 2000
C
C           CAUSEWAY OFF-LOADING MODE
C
 1700 ILUS=NHATNC(IACTEL)
      ITRUCK=LUSTRK(ILUS)
      JSLOT=IACTEL
      JHATCH=NCHCOR(JSLOT)
      IF(ITRUCK.NE.0) GO TO 1710
      I=NPRCAR(JHATCH)
      IF(CARGCT(I).GT..1) GO TO 1710
C
C     ERROR MESSAGE-NO TRUCK
C
      WRITE(NPRINT,1705)IACTEL,ILUS
 1705 FORMAT(1X,26HLOGIC ERROR- CAUSEWAY SLOT,I4,5H  LUS,I4,14H  HAS NO
     .TRUCK)
 1708 KCLOCK(IELEMT)=-KCLOCK(IELEMT)
      GO TO 2000
C
C           FIND SHIP TYPE TO DETERMINE OFF-LOADING ROUTINE
 1710 ISHIP=NSHPES(IACTEL)
      ISHPTP=IDSHIP(ISHIP)
C
C           SET PARAMETERS FOR ENTRY TO LOADING ROUTINE.
C
      ICRTYP=1
      ITIME=MTIME
      CCWT=0
      CCVL=0
      LDTIME=0
      IF(ITRUCK.EQ.0) GOTO 1723
```



```
      ITKTYP=ITTRUK(ITRUCK)
      WEIGHT=TRUKWT(ITKTYP)
      VOLUME=TRUKVL(ITKTYP)
      DO 1720 I=1,NCARTP
 1720 NCITEM(I)=NTCITM(ITKTYP,I)
      GOTO 1724
C
C           FOR NO VEHICLES--SET CAPACITY=0
C
 1723 WEIGHT=0
      VOLUME=0
      DO 1724 I=1,NCARTP
 1724 NCITEM(I)=0
 1725 L2=NSTINC(JHATCH)
      L1=0
      L3=LINDEX
      IF(JHATCH.NE.NCARHT)L3=NSTINC(JHATCH+1)-1
      DO 1730 I=L2,L3
      IF(NTOTAL(I).NE.0) GO TO 1740
 1730 CONTINUE
      WRITE(NPRINT,1735)JHATCH
 1735 FORMAT(1X,18HLOGIC ERROR- HATCH,I4,7H  EMPTY)
      GO TO 1708
C
C     INDEX NUMBERS FOUND IN HATCH TABLES.
C
 1740 L1=I
      NPRCAR(JHATCH)=0
      NCONTR=0
      ICRAFT=ITRUCK
C
C           TRANSFER TO APPROPRIATE LOADING ROUTINE BASED ON SHIP TYPE.
C
      GO TO (1751,1752,1753,1751,1752),ISHPTP
C
C           GEN. CARGO SHIP OR RO/RO SHIP
C
 1751 CALL LOGCS
      GO TO 1760
C
C           CONTAINER SHIP
C
 1752 CALL LOCONS
      GO TO 1760
C
C     SHIP TYPE CANNOT BE A LASH.
C
 1753 WRITE(NPRINT,1755) ISHIP
 1755 FORMAT(1X,17HLOGIC ERROR- SHIP,I4,21H  IS LASH AT CAUSEWAY)
      GO TO 1708
C
C     GENERATE NEXT EVENT FOR CAUSEWAY
C
 1760 NEVTYP(IELEMT)=16
      IF(NPRCAR(JHATCH).EQ.0)NEVTYP(IELEMT)=17
      IF(ITRUCK.EQ.0) GOTO 1761
```

```
      ITKTYP=ILTRUK(ITRUCK)
      NHSCRF(IACTEL,ITKTYP)=NHSCRF(IACTEL,ITKTYP)+1
      NTKCUM(ITRUCK,3)=NTKCUM(ITRUCK,3)+LDTIME
 1761 NHSCUM(IACTEL,4)=NHSCUM(IACTEL,4)+LDTIME
      NCLOCK(IELEMT)=MTIME+LDTIME
      OTIME=LDTIME/3600.
      WRITE(NTAPE,1765)IACTEL,NEVTYP(IELEMT),ITRUCK,OTIME,(LTKCAR(ITRUCK
     *,I),I=1,NCARTP)
 1765 FORMAT(1X,13HCAUSEWAY SLOT,I4,12H  NEXT EVENT,I4,7H  TRUCK,I4, 11H
     *  LOADED IT,F8.2,10H  HOURS  CARGO IS--/1X,40I3)
      IFLAG=1
      GO TO 2000
 1800 FORMAT(1X,59HDATA ERROR--CRAFT OFF-LOADING DATA INCONSISTENT--CARG
     *O TYPE,I4,6H  MHE,I4,12H  CRAFT TYPE,I4)
 1810 FORMAT(1X,I2,11I7)
 1820 FORMAT(1X,I1,3512)
C
C           RETROGRADE LOADING MODE
C
 1900 IF((NCONCG.EQ.0).AND.(ICONTP.NE.0)) GO TO 1910
C
C           LOGIC ERROR--CONDITIONS NOT CORRECT FOR  RETROGRADE
C
      WRITE(NPRINT,1905)NCONCG,ICONTP
 1905 FORMAT(1X,37HLOGIC ERROR--INCORRECT FOR RETROGRADE,2I5)
      NCLOCK(IELEMT)=-NCLOCK(IELEMT)
      CALL NCLOCK
      GO TO 2000
C
C           TRANSFER EMPTY CONTAINERS TRUCK-CRAFT.
C
 1910 ITEMP=TRUKWT(ITKTYP)/CARGWT(ICONTP)
      JTEMP=TRUKVL(ITKTYP)/CARGVL(ICONTP)
      KTEMP=NTCITM(ITKTYP,ICONTP)
      IF(KTEMP.LT.0) KTEMP=ITEMP
      LTEMP=LCRCAR(IACTEL,NCARTP+1)
      NUMBER=MIN0(ITEMP,JTEMP,KTEMP,LTEMP)
C
C           LOAD NUMBER OF RETROGRADE CONTAINERS
C
      LCRCAR(IACTEL,NCARTP+1)=LCRCAR(IACTEL,NCARTP+1)-NUMBER
      IF(LDCTTM(NTACTP,MHESUB,ICRTYP).LT.0) GOTO 1930
      LTIME=LTIME+LDCTTM(NTACTP,MHESUB,ICRTYP)*NUMBER
      IF(MHESUB.GT.NMHETF) GO TO 1940
      MHECAR(MHESUB,IMHEPL,NCARTP+1)=MHECAR(MHESUB,IMHEPL,NCARTP+1)+NUMB
     *ER
      GO TO 1940
 1930 WRITE(NPRINT,1800)ICONTP,MHESUB,ICRTYP
 1940 NPROCG(IACTEL)=0
      OTIME=LTIME/3600.
      WRITE(NTAPE,1950)NUMBER,ITRUCK,IACTEL,OTIME
 1950 FORMAT(1X,I4,35H  CONTAINERS RETROGRADED FROM TRUCK,I4,10H  TO CRA
     *FT,I4,4H  IN,F8.2,7H  HOURS)
      LTKCAR(ITRUCK,NCARTP+1)=1
      GO TO 1400
 2000 IF(IFLAG.EQ.1)CALL MINCLK
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```
      RETURN
      END
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      SUBROUTINE EVENTS
C
C        EVENT 6--PROCESSES CRAFT LEFT AT LUS, ASSIGNS TRUCKS AND
C        FOR MHE, CALLS EVENTA TO PERFORM LOADING, IF LOADING MAY
C        OCCUR.
C
C*****
C
      COMMON/A01/NCLOCK(100),NEVTYP(100),NOPEL(100),NELEMT(6),NCODE(20),
     .           NCLKEL,NLSTEL,NTIME,IEVTYP,IFLEMT,IACTEL,INTCUM,INTPER,
     .LPTIME,LOTIME,NPRINT,NTAPE,NCAPD,NTAPE1,NTAPE2,ICOUT,NTAPE3
C
      COMMON/A02/CARG-T(40),CARGVL(40),CARGCT(40),FCARHL(40),NCGTAG(40)
C
      COMMON/A03/CRAFWT(10),CRAFVL(10),CRAFSP(10,4),CRAFHT(10),NCRAFM(10
     .),NHLHAT(10),NCCITM(10,40),NFILF(10),CRAFFS(10)
C
      COMMON/A04/TRUKWT(10),TRUKVL(10),TRUKSP(10,2),NTCITM(10,40),NPRTKK
     .(10,13),FPRTCG(30),MHEPRY(10,10,13),MHFTRK(30),LDGTTM(13,15,10),LD
     .TCTM(13,15,10),
     .         NPRCAR,IPRTKK,ITRUCK,NTRUKO,NTRKPP
C
      COMMON/A05/IRSSHF( 5),NCHSHF( 5),IDSHIP( 5),NSHFHS(20),IDHSLT(20),
     .NCHCOR(20),LOCHS(20),NHATSS(20),NSTYP(20),NHATNO(20),IDCARH(20),NS
     .MOOP(20),NSTIND(20),NHATIX(100),NDCF(100),NACCES(100),NTOTAL(100),
     .NHTTAF(100,40),NSSST(5),
     .         ICHCOR,LINDEX
C
      COMMON/A06/NCRTYP(10),NTKTYP(10),NLSTYP(15),NMHTYP(15,3),IDCRAF(30
     .),IDTRUK(30),IDLUS(30),IDSDVH(20),
     .         NCARTP,NCRFTP,NTRKTP,NLUSTP,NMHETP,NHTSTP,NCARHT,NMHEPL
     .,NLUS,NSI,NTAGTP
C
      COMMON/A07/NSIST( 9),CAPST(3),ACAFST(3),LUSCRF(30),LUSTRK(30),LUSMH
     .E(30),LUSLCC(15),LUSSTT(15),LDCGTM(13,15,10),LDCTTM(13,15,10)
C
      COMMON/A08/LCRCAR(30,40),LTKCAR(30,40),LSTCAR(3,40)
C
      COMMON/A09/LISTCR(30),LISTHS(24),NSORT(30),NPRCAR(20),NPRCHC(10,10
     .,13),
     .         NLISCH,NLISHS,ISLOT,ICRAFT
C
      COMMON/A10/MODRTM(10,10),LOADTM(10,10,13),
     .NROT,NDECKI,NRTMFD,NRTMIS,NSMT,NSIMT,NHELOC,NSIWT
C
      COMMON/A11/NCITEM(40),NPLAT(20),
     .         ITIME,LDTIME,JSLOT,JHATCH,WEIGHT,VOLUME,L1,L3,CCWT,CCVL
     .         ,INDEX,NCONTR,CCFS,FLOOR
C
      COMMON/A12/LUSGUE(30),NPRCCG(30),NPRLUS(15,10,13),NPRMHE(15,10,13)
     .,LUSLIS(16),LUSRTM(10,15),LUSSDT(10,15),
     .         LUSCRG,NLUSPR,LUSOPN
C
      COMMON/A13/NCRCUM(30,15),NTKCUM(30,9),MHECYC(15,3,2),MHECAR(15,3,
     .40),MHECUM(15,3, 4),LUSUSE(30,10),LUSCUM(30,2),NSTCUM(2,40),NHSCUM
     .(20,7),NHSCRF(20,10),NTRAFF(2),NCRCAR(30,40),INECYC(30,2),KSTAT(30
     .,4,3),CSTAT(10,4,5)
C*****
      INTEGER*2NEVTYP,    NOPEL ,    NELEMT,    NCODE      A1
      INTEGER*2NCARHL,    NCGTA                            A2
      INTEGER*2NCRAFM,    NHLHAT,    NCCITM,    NFILF      A3
      INTEGER*2NTCITM,    NPRTKK,    NPRTCG,    MHEPRY     A4
      INTEGER*2MHFTRK,    LDGTTM,    LDTCTM                A4
      INTEGER*2NRSSHF,    NCHSHF,    IDSHIP,    NSHFHS     A5
      INTEGER*2IDHSLT,    NCHCOR,    LOCHS ,    NHATSS     A5
      INTEGER*2NSTYP ,    NHATNO,    IDCARH,    NSMOOP     A5
      INTEGER*2NSTIND,    NHATIX,    NDCF  ,    NACCES     A5
      INTEGER*2NTOTAL,    NHTTAF,    NSSST                 A5
      INTEGER*2NCRTYP,    NTKTYP,    NLSTYP,    NMHTYP     A6
      INTEGER*2IDCRAF,    IDTRUK,    IDLUS ,    IDSDVH     A6
      INTEGER*2LUSCRF,    LUSTRK,    LUSMHE,    LUSLCC     A7
      INTEGER*2LUSSTT,    LDCGTM,    LDCTTM                A7
      INTEGER*2LCRCAR,    LTKCAR,    LSTCAR                A8
      INTEGER*2LISTCR,    LISTHS,    NSORT ,    NPRCAR     A9
      INTEGER*2NPRCHC                                      A9
      INTEGER*2MODRTM,    LOADTM                           A10
      INTEGER*2NCITEM,    NPLAT                            A11
      INTEGER*2LUSGUE,    NPRCCG,    NPRLUS,    NPRMHE     A12
      INTEGER*2LUSLIS,    LUSRTM,    LUSSDT                A12
C
C           SET PARAMETERS FOR EVENT6--CRAFT LEFT AT LUS.
C
      ICARTP=NPRCCG(IACTEL)
      WRITE(NTAPE,2000) IACTEL,NOPEL(IFLEMT)
 2000 FORMAT(1X,5HCRAFT,I4,13H  LEFT AT LUS,I4)
      GO TO 2
C
C           ALTERNATE ENTRY--EVENT 16--CRAFT LEFT AT LUS FOR RETROGRAD
C           E OF CONTAINERS ONLY.
C
      ENTRY EVNT16
C
      WRITE(NTAPE,1) IACTEL,NOPEL(IFLEMT)
    1 FORMAT(1X,5HCRAFT,I4,13H  LEFT AT LUS,I4,14H  FOR RETROGRADE)
C
C           FIND CARGO TYPE TO USE FOR EMPTY CONTAINER.
C
      L2=NCARTP+1
      DO 1001 I=1,L2
      J=L2+1-I
      IF(CARGCT(J).EQ.-1.000) GOTO 1002
 1001 CONTINUE
      WRITE(NPRINT,1005)
 1005 FORMAT(1X,31HLOGIC ERROR-NO CONTAINER CARGO.)
      NCLOCK(IFLEMT)=-NCLOCK(IFLEMT)
      GOTO 1010
 1002 ICARTP=J
    2 JFLAG=0
      ILUS=NOPEL(IFLEMT)
      ICRTYP=IDCRAF(IACTEL)
      ITAGTP=NCGTAG(ICARTP)
      GO TO 8
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C
C           ALTERNATE ENTRY--EVENT 10--HATCH SLOT AT CAUSEWAY LEFT
C           WITHOUT A TRUCK.
C
      ENTRY EVNT10
      WRITE(NTAPE,1003) IACTEL
 1003 FORMAT(1X,10HHATCH SLOT,I4,29H  AT CAUSEWAY READY TO UNLOAD)
      ICRTYP=1
      ICHCOR=NCHCOR(IACTEL)
      ICARTP=CORCAR(ICHCOR)
      ITACTP=NCGTAG(ICARTP)
      GO TO 6
C
C     ALTERNATE ENTRY--EVENT 11--BARGE ARRIVES OR IS LEFT AT SEA WALL.
C
      ENTRY EVNT11
C
C           FIND HIGHEST PRIORITY CARGO TYPE.
C
      L1=NTPEL(IFLEMT)
      WRITE(NTAPE,1004) NOCB(L1),IACTEL,NHATNO(IACTEL)
 1004 FORMAT(1X,6HBARGE,I4,12H  HATCH SLOT,I4,5H  LUS,I4,17H  READY TO U
     *NLOAD)
      DO 3 I= 1,NCARTP
      IF(CNTTAB(L1,I).NE.0) GO TO 5
    3 CONTINUE
      WRITE(NPRINT,4)NOCB(L1),L1
    4 FORMAT(1X,17HDATA ERROR--BARGE,I4,7H  INDEX,I4,14H  HAS NO CARGO)
      NCLOCK(IFLEMT)=-NCLOCK(IFLEMT)
      JFLAG=1
      GOTO 1000
    5 ICARTP=I
      ITAGTP=NCGTAG(ICARTP)
      ICRTYP=NCRTYP+1
    6 ILUS=NHATNO(IACTEL)
      JFLAG=1
    8 IFLAG=0
      IMHETP=LUSMHE(ILUS)
      ITRUCK=LUSTRK(ILUS)
      ILUSTP=ILUSTP(ILUS)
      IMHEEL=LUSLOC(ILUSTP)
C
C           IS THERE A LOADED TRUCK AT THIS LUS?
C
      IF(ITRUCK.EQ.0) GO TO 100
C           IS TRUCK LOADED?
      L2=NCARTP+1
      DO 10 I=1,L2
      IF(LTKCAR(ITRUCK,I).GT.0) GO TO 75
   10 CONTINUE
C           EMPTY TRUCK AVAILABLE.
C
C           IF EMPTY TRUCK, THEN MHE MUST BE AVAILABLE TOO.
C
      GO TO 410
C
```

```
C           [illegible] TRUCK [illegible]
C
   75 LTKCAR(ITRUCK,NCARTP+1)
    8 LUSTRK(ILUS)
      CALL TRKREL(IMHEEL)
C
C           SEARCH FOR NEW TRUCK ASSIGNMENT.
C
  100 IF ((IMHEPL.EQ.3).OR.(CARCST(ICARTP).LT..1)) GO TO 110
      IF(CRALM(ICRTYP).EQ.0) GOTO 205
      KPRCAR=ICARTP
      CALL TRKSEL
      IF(ITRUCK.NE.0) GO TO 200
C
C           NO NEW TRUCK ASSIGNMENT. IS A TRUCK REQUIRED?
C
  110 IF(NCARHL(KPRCAP).LE.2) GO TO 500
      IF(ACAPST(IMHEEL).GE.CAPST(IMHEEL)) GO TO 500
      IF(ILUSTP.EQ.8) GO TO 510
C
C           TRUCK AVAILABLE, OR NOT REQUIRED.
C           IS CURRENT MHE ACCEPTABLE?
C
  200 ITEST = ILUSTP
      JMHETP=0
      IF((LUSSTT(ILUSTP).EQ.5).OR.(LUSSTT(ILUSTP).EQ.1)) GOTO 240
      JMHETP=-1
  240 DO 250 I=1,NLUSPR
         IF(KMHETP.EQ.IMHETP) GO TO 300
      IF(NPRLUS(I,ICRTYP,ITAGTP).NE.ITEST) GO TO 250
      KMHETP=NPRMHE(I,ICRTYP,ITAGTP)
      IF(JMHETP.NE.-1) GO TO 250
      IF((KMHETP.EQ.0).OR.(NMHTYP(KMHETP,IMHEPL).LT.0)) JMHETP=KMHETP
  250 CONTINUE
C
C           IF LUS TYPE IS FIXED BEACH, MOBILE BEACH LUS TYPE SHOULD
C           ALSO BE TRIED FOR MHE SELECTION.
C
      IF(ITEST.NE.ILUSTP) GO TO 280
      IF(LUSSTT(ILUSTP).EQ.2) GOTO 260
      GO TO 280
C
C           LUS TYPE IS FIXED BEACH, FIND MOBILE BEACH TYPE [illegible]
C           MHE TYPES AGAIN.
C
  260 DO 270 I=1,NLUSTP
      IF((LUSLOC(I).EQ.IMHEEL).AND.(LUSSTT(I).EQ.4)) GOTO 275
  270 CONTINUE
      GO TO 280
  275 ITEST =I
      GO TO 240
C
C           CURRENT MHE IS UNACCEPTABLE.
C           IS ANOTHER MHE TYPE AVAILABLE?
C
  280 IF(JMHETP.EQ.-1) GO TO 400
```

```
C
C          MHE FOUND -- ASSIGN NEW MHE.
C
      IF(IMHETP.NE.0)IFLAG=1
  290 LUSMHE(ILUS)=JMHETP
      IF(JMHETP.NE.0)NMHTYP(JMHETP,IMHEPL)=NMHTYP(JMHETP,IMHEPL)-1
C
C          ASSIGN TRUCK IF AVAILABLE
C
  300 IF(ITRUCK.EQ.0) GO TO 310
      ISUB=NELEMT(1)+ITRUCK
      NTRCUM(ITRUCK,2)=NTRCUM(ITRUCK,2)+MTIME+NCLOCK(ISUB)
      NCLOCK(ISUB)=-MTIME
      NSVTYP(ISUB)=0
      NOPEL(ISUB)=ILUS
      LUST=K(ILUS)=ITRUCK
      NTRUKQ=NTRUK -1
  310 WRITE(NTAPE,320)ILUS,IACTEL,LUSMHE(ILUS),ITRUCK,ICARTP
  320 FORMAT(1X,6HAT LUS,I4,10H  --CRAFT-,I4,11H  MHE TYPE-,I4,8H  TRUCK
     .-,I4,13H  CARGO TYPE-,I4)
C
C          PERFORM 1 CYCLE OF LOADING AS IN EVENT4
C
      CALL EVENT4
      GO TO 600
C
C          MHE UNACCEPTABLE--NO ACCEPTABLE TYPE AVAILABLE.
C
  480 WRITE(NTAPE,485)IACTEL,ILUS,IMHETP,ICARTP
  485 FORMAT(1X,6HCRAFT,I4,14H  WAITS AT LUS,I4,10H  MHE TYPE,I4,29H  UN
     .ACCEPTABLE FOR CARGO TYPE,I4)
      GO TO 520
C
C          TRUCK, REQUIRED, BUT NOT AVAILABLE; LOADING DISCONTINUED.
  500 WRITE(NTAPE,510) ILUS,IACTEL
  510 FORMAT(1X,3HLUS,I4,26H  REQUIRES A TRUCK.  CRAFT,I4,8H  WAITS.)
C
C          SET CRAFT CLOCK TO WAIT STATE.
C
  520 IF(IMHETP.NE.0)IFLAG=1
      LUSMHE(ILUS)=0
      NCLOCK(IELEMT)=-NCLOCK(IELEMT)
C
C          RETURN MHE TO POOL + REASSIGN, IF APPROPRIATE.
C
  600 IF(IFLAG.EQ.1) GO TO 1000
      NMHTYP(IMHETP,IMHEPL)=NMHTYP(IMHETP,IMHEPL)+1
      MHECYC(IMHETP,IMHEPL,1)=MHECYC(IMHETP,IMHEPL,1)+1
      IF(NMHTYP(IMHETP,IMHEPL).GT.1) GO TO 1000
C
C          NEW MHE TYPE RETURNED TO POOL.
C          LOOK FOR MHE REASSIGNMENT.
C
C
C          ASSIGN MHE TO WAITING CRAFT?
C
```



```
      CALL WAITCF(IMHETP,IMHEPL)
      IF(NMHTYP(IMHETP,IMHEPL).EQ.0) GOTO 1000
C
C          ASSIGN CRAFT FROM LUS
C
      CALL CLUSSL
      IF(NMHTYP(IMHETP,IMHEPL).EQ.0) GOTO 1000
C
C          ASSIGN MHE TO TRUCK WAITING AT TRA OR ISS?
C
      CALL WATTRK(IMHETP,IMHEPL)
      IF(NMHTYP(IMHETP,IMHEPL).EQ.0) GOTO 1000
C
C          ASSIGN TRUCK TO TRA OR ISS?
C
      CALL TRKASS(IMHETP,IMHEPL)
 1000 IF(JFLAG.EQ.1) CALL MINCLK
 1010 RETURN
      END
```

```
      SUBROUTINE EVENT
C
C          EVNT16--CRAFT LEAVES LUS. SENDS CRAFT TO SHIP-S QUEUE.
C          SENDS TRUCK, IF ANY, T- TSS OR DEP-T. RETURNS MHE, IF ANY,
C          TO POOL. SEARCH FOR NEW CRAFT, TRUCK OR MHE ASSIGNMENTS.
C
C*****
C
      COMMON/A01/NELOCK(100),NEVTYP(100),NOPEL(100),NELEMT(6),NCODE(20),
     .          NCLKEL,NLSTEL,NTIME,IEVTYP,IELEMT,IACTEL,INTCUM,INTPER,
     .LPTIME,LOTIME,NRRIGT,NTAPE,NCARD,NTAPE1,NTAPE2,ICOUT,NTAPE3
C
      COMMON/A02/CARCNT(40),CARGVL(40),CARGCT(40),NCARHL(40),NCGTAG(40)
C
      COMMON/A03/CRAFWT(10),CRAFVL(10),CRAFSP(10,4),CRAFHT(10),NCRAFM(10
     .),HOLHAT(10),NCCITM(10,40),NFILE(10),CRAFFS(10)
C
      COMMON/A04/TRUKWT(10),TRUKVL(10),TRUKSP(10,2),NTCITM(10,40),NPETRK
     .(10,13),PHTCG(30),MPEPRY(10,10,13),MHETRK(30),LOGTIM(13,15,10),LO
     .TTIM(13,15,10),
     .          KPECAR,IPRTRK,ITRUCK,NTRUKQ,NTRKPR
C
      COMMON/A05/NSSHPE( 5),NCHSHP( 5),IDSHIP( 5),NSHPHS(20),IDHSLT(20),
     .NCHCAR(20),LOCFS(20),NHATSS(20),NSTYPE(20),NHATNO(20),IDCARH(20),NS
     .COMP(20),NSTINC(20),NHATIX(100),NDCH(100),NACCES(100),NTOTAL(100),
     .NHTITM(100,40),NSSSI(5),
     .          ICHCPS,LINDEX
C
      COMMON/A06/NCRTYP(10),NTKTYP(10),NLSTYP(15),NMHTYP(15,3),IDCRAF(30
     .),IDTRUK(30),IDLUS(30),IDSDVE(20),
     .          NCARTP,NCHETP,NTRKTP,NLUSTP,NMHETP,NHTSTP,NCARHT,NMHEPL
     .,NLUS,NSI,NTOTT
C
      COMMON/A07/DIST( 9),CAPST(3),ACAPST(3),LUSCRF(30),LUSTRK(30),LUSMH
     .E(15),LUSLOC(15),LUSSTT(15),LDCGTM(13,15,10),LDCTTM(13,15,10)
C
      COMMON/A08/LCRCAR(30,40),LTKCAR(30,40),LSTCAR(3,40)
C
      COMMON/A09/LISTCR(30),LISTHS(24),NSORT(3,),NFRCAR(20),NPRCHC(10,10
     .,10),
     .          NLISCR,NLISHS,ISLOT,ICRAFT
C
      COMMON/A10/MORTM(10,10),LOADTM(10,10,13),
     .NOUT,NOBLCK,NRTMEC,NRTMIE,NSMT,NSIMT,NHELOD,NSIWT
C
      COMMON/A11/NCITEM(40),NFLAT(20),
     .          ITIME,LETIME,JSLOT,JHATCH,WEIGHT,VOLUME,L1,L3,CCWT,CCVL
     .          ,INDEX,NCNTR,CCFS,FLOOR
C
      COMMON/A12/LUSQUE(30),NPRCC(3)),NPRLUS(15,10,13),NPRMHE(15,10,13)
     .,LUSLIS(16),LUSPTM(10,15),LUSSDT(10,15),
     .          LUSCRG,NLUSPR,LUSOPN
C
      COMMON/A13/NCRCUM(30,15),NTKCUM(30,9),MHECYC(15,3,2),MHECAR(15,3,
     .40),MHECUM(15,2, 4),LUSUSE(30,10),LUSCUM(30,2),NSTCUM(2,40),NHSCUM
     .(20,2),NHSCRE(20,10),NTRAFF(2),NCRCAR(30,40),INDCYC(30,2),KSTAT(30
     .,4,2),STAT(2,4,5)
C*****
      INTEGER*2NEVTYP,        NOPEL,         NELEMT,        NCODE          A1
      INTEGER*2NCASHL,        NCGTAG                                       A2
      INTEGER*2NCRAFM,        HOLHAT,        NCCITM,        NFILE          A3
      INTEGER*2NTCITM,        NPETRK,        NPETCG,        MHEPRY         A4
      INTEGER*2MHETRK,        LOCTTM,        LOGTIM                        A4
      INTEGER*2NSSHPE,        NCHSHP,        IDSHIP,        NSHPHS         A5
      INTEGER*2IDHSLT,        NCHCAR,        LOCFS,         NHATSS         A5
      INTEGER*2NSTYPE,        NHATNO,        IDCARH,        NSCOMP         A5
      INTEGER*2NSTINC,        NHATIX,        NDCH,          NACCES         A5
      INTEGER*2NTOTAL,        NHTITM,        NSSSI                         A5
      INTEGER*2NCRTYP,        NTKTYP,        NLSTYP,        NMHTYP         A
      INTEGER*2IDCRAF,        IDTRUK,        IDLUS,         IDSDVE         A
      INTEGER*2LUSCRF,        LUSTRK,        LUSMHE,        LUSLOC         A7
      INTEGER*2LUSSTT,        LDCGTM,        LDCTTM                        A7
      INTEGER*2LCRCAR,        LTKCAR,        LSTCAR                        A8
      INTEGER*2LISTCR,        LISTHS,        NSORT,         NPRCAR         A9
      INTEGER*2NPRCHC                                                      A9
      INTEGER*2MORTM,         LOADTM                                       A1
      INTEGER*2NCITEM,        NFLAT                                        A11
      INTEGER*2LUSQUE,        NPRCCC,        NPRLUS,        NPRMHE         A12
      INTEGER*2LUSLIS,        LUSPTM,        LUSSDT                        A12
C
C          SET PARAMETERS FOR CRAFT-EVENTS
C
      ILUS=NOPEL(IACTEL)
      ICRTYP=IDCRAF(IACTEL)
      IFLAG=0
      GO TO 4
C
C          ENTRY EVNT17-HATCH SLOT AT CAUSEWAY IS EMPTY.
C
      ENTRY EVNT17
      ICRTYP=1
      GO TO 2
C
C          ENTRY EVNT18-BARGE IS EMPTY.
C
      ENTRY EVNT18
      ICRTYP=NCRETP+1
    2 ILUS=NHATNO(IACTEL)
      IFLAG=1
    4 ILUSTP=IDLUS(ILUS)
      IMHEPL=LUSLOC(ILUSTP)
      ITIME=0
      DIS=0
      LFLAG=0
C
C          IS THERE A TRUCK AT THIS LUS?
C
      IF(LUSTRK(ILUS).EQ.0) GO TO 2010
      ITRUCK=LUSTRK(ILUS)
      LUSTRK(ILUS)=0
      CALL TRKDES(IMHEPL)
C
```

```
C                EMPTY CAUSEWAY SLOT
C
 2010 IF(IEVTY .NE.17) GO TO 2100
C
C                PROCESS EVENT 17-EMPTY HATCH SLOT AT CAUSEWAY.
C
C                [illegible] DEPARTED
C
      [illegible](ILUS)=[illegible]
      LUS[illegible](ILUS)=0
C
C                [illegible] HATCH SLOT CONDITIONS.
C
      NHATSS(IACTEL)=[illegible]
      NSL[illegible](IFLEMT)=-1
      NEVTYP(IFLEMT)=-1
C
C                CHECK FOR SHIP DEPARTURE
C
      I[illegible]=IACTEL
      CALL [illegible]
      GO TO 1[illegible]
C
C                SEA WALL VACATED FOR BARGE.
C
 2050 I[illegible]=1
      LUS[illegible](ILUS)=[illegible]
C
C                FIND HATCH SLOT CORRESPONDING TO SEA WALL.
C
      L2=[illegible]LEMT(4)
      DO 2060 I=1,L2
      IF((I[illegible]SLT(I).[illegible]).AND.(NHATHC(I).EQ.ILUS)) GO TO 2065
 2060 CONTINUE
C
C                ERROR ROUTINE
C
      WRITE(NPRINT,2062) ILUS
 2062 FORMAT(1X,[illegible]GIC ERROR- LUS,I4,19H HAS NO HATCH SLOT.)
      GO TO 1[illegible]
C
C                FIND CARGO HATCH FOR LASH AND BARGE INDEX NUMBER.
C
 20[illegible] IACTEL=I
      I[illegible]=(L[illegible]+NELEMT(3)) +I
      ICHC[illegible]=[illegible](I)
      L1=[illegible](ICHC[illegible])
      GO TO 21[illegible]
C
C                EMPTY BARGE?
C
 2100 IF(IEVTYP.NE.18) GO TO [illegible]
C
C                PROCESS EVENT18-EMPTY BARGE.
C
C                FIND NEXT BARGE.
C
      L1=[illegible](L[illegible])
      WRITE(NTAPE,[illegible]) [illegible](L1),I[illegible]
 2102 FORMAT(1X,[illegible]BARGE,I4,1[illegible] [illegible] LUS,I4)
      ICHC[illegible]R=[illegible](L1)
      L1=L1+1
 2105 L3=L[illegible]
      IF(I[illegible]R.NE.NCA[illegible](L3)[illegible](ICHCOR+1)-1
C
C                LAST BARGE DEPARTING?
C
      IF(L1.GT.L3) GO TO 2200
C
C                LOOP THRU HATCH SLOTS TO FIND FIRST UNASSIGNED BARGE.
C
      L2=N[illegible]+NELEMT(3)+1
      L4=L2+NELEMT(4)-1
      DO 2110 I=L2,L4
      IF((NEVTYP(I).EQ.11).AND.([illegible](I).GE.L1)) L1=[illegible](I)+1
 2110 CONTINUE
      IF(L1.GT.L3) GO TO 2200
C
C                FIND FIRST UNASSIGNED NON-EMPTY BARGE.
C
      DO 2120 I=L1,L3
      IF(NTOTAL(I).GT.0) GO TO 2130
 2120 CONTINUE
      GO TO 2200
C
C                NEXT BARGE HAS BEEN FOUND.
C                ASSIGN BARGE AND GENERATE EVENT11.
C
 2130 INDEX=I
      NOPEL(IFLEMT)=INDEX
      LUSCRF(ILUS)=NCCF(INDEX)+10
      NEVTYP(IFLEMT)=11
      NCLOCK(IFLEMT)=MTIME+LUS[illegible]TM(ICRTYP,ILUST[illegible])
      WRITE(NTAPE,2140) NBCE(INDEX),ILUS
 2140 FORMAT(1X,5HBARGE,I4,17H  ASSIGNED TO LUS,I4)
      GO TO 1000
C
C                NO BARGES LEFT TO ASSIGN.
C
C
C                CHECK FOR DEPARTURE OF LASH
C
 2200 NHATSS(IACTEL)=3
      ISLOT=IACTEL
      WRITE(NTAPE,2205) ILUS,ISLOT
 2205 FORMAT(1X,[illegible]NO MORE BARGES--LUS,I4,7H  -SLOT,I4,[illegible]-  IS [illegible] LONGE
     .R A HATCH SLOT.  RENUMBER SEA WALL SLOTS.)
      CALL SH[illegible]
C
C                REMOVE HATCH SLOT FROM CLOCK
C
      L1=I[illegible]LEMT+1
```

```
      IF(IELEMT.GE.NLSTEL) GO TO 2230
      DO 2210 I=L1,NLSTEL
      NCLOCK(I-1)=NCLOCK(I)
      NEVTYP(I-1)=NEVTYP(I)
 2210 NOPEL(I-1)=NOPEL(I)
C
C           UPDATE HATCH SLOT STATES
C
      L1=IACTEL+1
      IF(IACTEL.GE.NELEMT(4)) GO TO 2230
      L2=NELEMT(4)
      DO 2220 I=L1,L2
      IOHSLT(I-1)=IOHSLT(I)
      LOCHS(I-1)=LOCHS(I)
      NSHPHS(I-1)=NSHPHS(I)
      NHATSS(I-1)=NHATSS(I)
 2220 NHATNO(I-1)=NHATNO(I)
 2230 NCLOCK(NLSTEL)=0
      NEVTYP(NLSTEL)=0
      NOPEL(NLSTEL)=0
      NLSTEL=NLSTEL-1
      IOHSLT(L2)=0
      LOCHS(L2)=0
      NSHPHS(L2)=0
      NHATSS(L2)=0
      NHATNO(L2)=0
      NELEMT(4)=NELEMT(4)-1
C
C           SEA WALL IS OPEN. UPDATE LUS LIST AND CHECK FOR
C           REASSIGNMENT.
C
      GO TO 45
C
C           SEND CRAFT TO SHIP-S QUEUE.
C
    8 GO TO (30,20,10),IMHEPL
C           LEAVING DEPOT
   10 DIS=DIS+DIST(8)+DIST(6)
C           LEAVING ISS
   20 DIS=DIS+DIST(7)+DIST(5)
      ITIME=3600.*DIS/CRAFSP(ICRTYP,1)+.5
C           LEAVING BEACH.
   30 DIS=DIST(4)+DIST(3)
      ITIME=ITIME+3600.*DIS/(1.1515*CRAFSP(ICRTYP,3))+.5
      NCYCLE=NCRCUM(IACTEL,1)+1
      NCRCUM(IACTEL,14)=NCRCUM(IACTEL,14)+ITIME
      WRITE(NTAPE2,1910)NCODE(17),NCYCLE,IACTEL,MTIME,ILUS,ITIME
      NCLOCK(IACTEL)=MTIME+ITIME
      OTIME=NCLOCK(IACTEL)/3600.
      NEVTYP(IACTEL)=1
      NOPEL(IACTEL)=0
      WRITE(NTAPE,40) IACTEL,ILUS,OTIME
   40 FORMAT(1X,5HCRAFT,I4,12H  LEAVES LUS,I4,23H  TO ARRIVE SHIP-S Q AT
     *,F6.2,8H  HOURS.)
C
C           IS LUS A SEA WALL?
C
      IF(LUSSTT(ILUSTP).NE.1) GOTO 45
C
C           SEA WALL LUS. IS A LASH PRESENT?
C
      L1=NCLKEL+1
      L2=NCLKEL+NELEMT(3)
      DO 42 I=L1,L2
      IF(NEVTYP(I).NE.6) GO TO 42
      ISUB=I-NCLKEL
      IF(ILSHIP(ISUB).EQ.5) GO TO 2350
   42 CONTINUE
C
C           NO LASH IN SYSTEM
C
C
C     UPDATE LUS LIST.
C
   45 LUSCRF(ILUS)=0
      LUSOPN=LUSOPN+1
      IF(LUSLIS(ILUSTP).EQ.0) GO TO 50
      IF(LUSLIS(ILUSTP).LT.ILUS) GO TO 70
      GO TO 55
   50 LFLAG=1
   55 LUSLIS(ILUSTP)=ILUS
C
C           MHE RETURNED
C
   70 IF(LUSMHE(ILUS).EQ.0) GO TO 500
      IMHETP= LUSMHE(ILUS)
      NMHTYP(IMHETP,IMHEPL)=NMHTYP(IMHETP,IMHEPL)+1
      MHECYC(IMHETP,IMHEPL,1)=MHECYC(IMHETP,IMHEPL,1)+1
      LUSMHE(ILUS)= 0
      IF(NMHTYP(IMHETP,IMHEPL).GT.1) GO TO 500
C
C           LOOK FOR NEW MHE,TRUCK OR CRAFT ASSIGNMENTS.
C
      CALL WATCRF(IMHETP,IMHEPL)
      IF(NMHTYP(IMHETP,IMHEPL).EQ.0) GO TO 500
      CALL CLUSSI
      IF(NMHTYP(IMHETP,IMHEPL).EQ.0)GO TO 1000
      CALL WATTRK(IMHETP,IMHEPL)
      IF(NMHTYP(IMHETP,IMHEPL).EQ.0) GO TO 1000
   80 CALL TRKASS(IMHETP,IMHEPL)
      GO TO 1000
C
C           ASSIGNMENTS DUE TO OPENING OF LUS?
C
  500 IF(LFLAG.NE.1) GO TO 990
      IEVTYP=1
      CALL CLUSSI
C
C           CHECK FOR TRUCK ASSIGNMENT TO ISS IF A HELICOPTER HAS LEFT
C           CARGO THERE.
C
  990 IF((CRAFM(ICRTYP).EQ.6).AND.(IMHEPL.EQ.2)) GOTO 40
```

```
C
C         UPDATE CLOCK, IF REQUIRED.
C
 1000 IF(IFLAG.EQ.1) CALL MINCLK
      RETURN
 1010 FORMAT(1X,I9,1117)
      END
```



```
      SUBROUTINE EVENT7
C
C              EVENT7-LCARE. TRUCK LEAVES IFAZ/SS. TRUCK SENT TO ISS/
C              DEPOT, MHE RETURNED TO POOL, NEW CRAFT OR TRUCK ASSIGNMENTS
C              TRIED. ALTERNATE ENTRY--EVENTS- UNLOADED TRUKC LEAVES ISS/
C              DEPOT.
C
C*****
C
      COMMON/A01/NCLOCK(100),NEVTYP(100),NOPEL(100),NELEMT(6),NCOLE(20),
     .          NCLKEL,NLSTEL,MTIME,IEVTYP,IELEMT,IACTEL,INICUM,INTOFR,
     .LPTIME,LOTIME,NPRINT,NTAPE,NCARD,NTAPE1,NTAPE2,ICOUT,NTAPE3
C
      COMMON/A02/CARLWT(40),CARCVL(40),CARCCT(40),NCARLL(40),NCSTAC(40)
C
      COMMON/A03/CRAFWT(10),CRAFVL(10),CRAFSP(10,4),CRAFHT(10),NCRAFM(10
     .),MULHAT(10),NCCITM(10,40),NTILE(10),CRAFES(10)
C
      COMMON/A04/TRUKWT(10),TRUKVL(10),TRUKSP(10,2),NTCITM(10,40),NRSTRK
     .(10,13),NPETCC(40),MHEPHY(10,1,13),NHETRK(40),LDGTTM(13,15,10),LI
     .TGTM(13,15,10),
     .          KPSCAR,IPRTRK,ITRUCK,NTRUKU,NTEKPF
C
      COMMON/A05/NGSHIP( 5),NCHSHP( 5),IDSHIP( 5),NSHPHS(20),ISHPLT(20),
     .NCHCOR(20),LCCHS(20),NHATSS(20),NSTYP(20),NHATPS(20),IBCARN(20),NC
     .BOOM(20),NSTING(20),NHATIX(100),NBCP(100),NACCEL(100),NTOTAL(100),
     .NHITAB(100,40),NSSSI(5),
     .          ICHCUP,LINDEX
C
      COMMON/A06/NCRTYP(10),NTKTYP(10),NLSTYP(10),NMHTYP(10,7),IDCHAR(
     .),IPTRUK(30),IELUS(30),IESDVE(20),
     .          NCARTP,NCRETP,NTRKTP,NLLSTP,NMHETP,NHISTP,NCARHT,NMHEEL
     ..NLUS,NSI,NTAGTF
C
      COMMON/A07/DIST( 9),CAPST(3),ACAPST(3),LUSCEF(3),LUSTRK(3),LUSMH
     .E(30),LUSLOC(15),LUSSTT(15),LDCGTM(15,15,10),LTTTM(15,15,1 )
C
      COMMON/A08/LCPCAR(30,40),LTKCAR(30,40),LSTCAR(3,40)
C
      COMMON/A09/LISTCR(30),LISTHS(24),NSORT(30),LERCAR(20),NERCHC(10,10
     ..13),
     .          NLISCH,NLISHS,ISLOT,ICRAFT
C
      COMMON/A10/MCORTP(10,10),LDALTP(10,10,13),
     .NHDT,NDECKF,NKTMP2,NFTMP1,NCNT,NSIMT,NHELOD,NSIVT
C
      COMMON/A11/NCITEM(40),NPLAT(20),
     .          ITIME,LGTIME,JSLOT,JHATCH,WEIGHT,VOLUME,L1,L4,CCWT,CCVL
     .          ,INDEX,NCONTR,CCES,FEGOR
C
      COMMON/A12/LUSQUE(30),NFRCC(30),NFRLUS(15,10,13),NPLNHE(15,10,13)
     ..LUSLIS(16),LUSHTM(10,15),LUSSET(10,15),
     .          LUSFRO,NLUSPK,LUSPR
C
      COMMON/A13/NCRCUP(30,15),NTKCUP(30,9),MHECYC(15,3,2),MHECAR(15,5,
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```
     *40),MHECUM(10,2, 4),LUSUSE(30,10),LUSCUM(30,2),KSTCUM(2,40),NHSCUM
     *(20,7),NHSCRE(20,10),NTRAFF(2),NCRCAR(30,40),IMHCYC(30,7),KSTAT(30
     **4,2),CSTAT(30,4,3)
C
      INTEGER*2NEVTYP,       NCPEL ,        NELEMT,        NCODE         A1
      INTEGER*2NCAEEL,       NCGTAG                                      A2
      INTEGER*2NCRAFM,       MULHAT,        NCCITM,        NFILE         A3
      INTEGER*2NICITM,       NERTRK,        NPRTCC,        MHEPRY        A4
      INTEGER*2MHETRK,       LOGTIM,        LOTGTM                       A4
      INTEGER*2NESSHP,       NCHSHP,        IDSHIP,        NSHPHS        A5
      INTEGER*2ICHSLT,       NCHCCR,        LOCHS ,        NHATSS        A5
      INTEGER*2USTYP ,       NHATNO,        IDCARH,        NSHOOM        A5
      INTEGER*2NSTIND,       NHATIX,        NDCB ,         NACCES        A5
      INTEGER*2NITIAL,       NHITAB,        NSCST                        A5
      INTEGER*2NCRTYP,       NIKTYP,        NLSTYP,        NMHTYP        A6
      INTEGER*2ITCHAE,       IDTRUK,        IDLUS ,        IDSDVH        A6
      INTEGER*2LUSCRE,       LUSTRK,        LUSMHE,        LUSLOC        A7
      INTEGER*2LUSSIT,       LOCGTM,        LOCTIM                       A7
      INTEGER*2LCRCAR,       LIKCAR,        LSTCAR                       A8
      INTEGER*2LISTCR,       LISTHS,        NSCRT ,        NPRCAR        A9
      INTEGER*2NPPCHC                                                    A9
      INTEGER*2MCDHTM,       LOADTM                                      A10
      INTEGER*2NCITEM,       NPLAT                                       A11
      INTEGER*2LUSCUE,       NPRCCG,        NPRLUS,        NPRMHE        A12
      INTEGER*2LUSLIS,       LUSBTM,        LUSSRT                       A12
C
C             SEND TRUCK TO ISS/DEPOT.
C
      IMHEPL=NOPEL(IELEMT)
      ITRUCK=IACTEL
      CALL TRKEES(IMHEPL)
      GO TO 10
C
C             EVENT9-UNLOADED TRUCK LEAVES ISS/DEPOT. SEND TRUCK TO QUEUE.
C
      ENTRY EVENT9
      IMHEPL=NOPEL(IELEMT)
      ITKTYP=IDTRUK(IACTEL)
      DIS=0
      IF(IMHEPL.EQ.2) GO TO 5
      DIS=DIST(6)+DIST(8)+DIS
      NTRAFF(1)=NTRAFF(1)+1
    5 DIS=DIST(7)+DIS
      ITIME=3600.*DIS/TRUKSP(ITKTYP,1)+.5
C
C             UPDATE TRUCK STATISTICS
C
      NTKCUM(IACTEL,5)=NTKCUM(IACTEL,5)+ITIME
      ITEMP=NTKCUM(IACTEL,1)+1
      JTEMP=MTIME+ITIME
      KTEMP=0
      WRITE(NTAPE2,7)NCODE(7),ITEMP,IACTEL,JTEMP,IMHEPL,KTEMP,ITIME
    7 FORMAT(1X,I2,1117)
      JTIME=ITIME/3600.
      WRITE(NTAPE,8)IACTEL,IMHEPL,CTIME
    8 FORMAT(1X,5HTRUCK,I4,13H  LEAVES AREA,I3,21H  TRAVELS TO QUEUE IN,
```


EVENT7   DATE = 76311   23/54/05

```
     *F6.2,4H  HOURS.)
C
C             GENERATE EVENT 12-TRUCK ARRIVES QUEUE.
C
      NCLOCK(IELEMT)=MTIME+ITIME
      NEVTYP(IELEMT)=12
      NOPEL(IELEMT)=0
C
C             ANY MHE ASSIGNED TO TRUCK?
C
   10 IF(MHETRK(IACTEL).EQ.0) GO TO 1000
C
C             RETURN MHE TO POOL
C
      IMHETP=MHETRK(IACTEL)
      MHETRK(IACTEL)=0
      NMHTYP(IMHETP,IMHEPL)=NMHTYP(IMHETP,IMHEPL)+1
C
C             UPDATE MHE STATISTICS
C
      MHECYC(IMHETP,IMHEPL,2)=MHECYC(IMHETP,IMHEPL,2)+1
C
C             ANY OTHER UNITS OF THIS MHE TYPE IN THIS POOL?
C
      IF(NMHTYP(IMHETP,IMHEPL).GT.1) GO TO 1000
C
C             NEW MHE TYPE. CAN MHE BE ASSIGNED TO WAITING CRAFT?
C
      CALL WATCRF(IMHETP,IMHEPL)
C
C             MHE USED?
C
      IF(NMHTYP(IMHETP,IMHEPL).EQ.0) GO TO 1000
C
C             NEW CRAFT ASSIGNMENT?
C
      IEVTYP=0
      CALL CLUSSL
C
C             MHE USED?
C
      IF(NMHTYP(IMHETP,IMHEPL).EQ.0) GO TO 1000
C
C             SEARCH FOR WAITING TRUCK ASSIGNMENT.
C
      CALL WATTRK(IMHETP,IMHEPL)
C
C             MHE USED?
C
      IF(NMHTYP(IMHETP,IMHEPL).EQ.0) GO TO 1000
C
C             SEARCH FOR TRUCK ASSIGNMENT TO TRA/ISS.
C
      CALL TRKASI(IMHETP,IMHEPL)
 1000 RETURN
      END
```

```
      SUBROUTINE EVENTP(IMHETP,IMHEPL,ITRK)
C
C          EVENTP-- LOADED TRUCK ARRIVES AT ISS/DEPOT, UNLOADS TRUCK
C          (ARRIVING TRUCK, OR WAITING TRUCK JUST ASSIGNED MHE) AT ISS
C          OR DEPOT. CALLED FROM MAIN OR WAITRK.
C
C*****
C
      COMMON/A1/NCLOCK(100),NEVTYP(100),NOPEL(100),NELEMT(6),NCODE(20),
     *         NELKEL,NLSTEL,MTIME,IEVTYP,IELEMT,IACTEL,INTCUM,INTPER,
     *LPTIME,LOTIME,NPRINT,NTAPE,NCARD,NTAPE1,NTAPE2,ICOUT,NTAPE3
C
      COMMON/A2/CARGWT(40),CARGVL(40),CARGCT(40),NCARHL(40),NCGTAG(40)
C
      COMMON/A4/TRUKWT(10),TRUKVL(10),TRUKSP(10,2),NTCITM(10,40),NPRTRK
     *(13,15),NPRTCG(30),MHEPRY(10,10,13),MHETRK(30),LDGTTM(13,15,10),LD
     *TCTM(13,15,10),
     *         NPRCGR,IPRTRK,ITRUCK,NTRUKQ,NTRKPR
C
      COMMON/A6/NCRTYP(10),NTKTYP(10),NLSTYP(15),NMHTYP(15,3),IDCRAF(30
     *),IDTRUK(30),IDLUS(30),IDSDVH(20),
     *         NCARTP,NCREFP,NTRKTP,NLUSTP,NMHETP,NHTSTP,NCARHT,NMHEPL
     *,NLUS,NS1,NTAGTP
C
      COMMON/A07/DIST(5),CAPST(3),ACAPST(3),LUSCEF(30),LUSTRK(30),LUSMH
     *F(30),LUSLOC(15),LUSSTT(15),LDCGTM(13,15,10),LDCTTM(13,15,10)
C
      COMMON/A08/LCPCAR(30,40),LTKCAR(30,40),LSTCAR(3,40)
C
      COMMON/A13/NERCUP(30,15),NTKCUP(30,9),MHECYC(15,3,2),MHECAR(15,3,
     *40),MHECUM(15,3,4),LUSUSE(30,10),LUSCUM(30,2),NSTCUM(2,40),NHSCUM
     *(20,7),NHSCHE(20,10),NTHAFF(2),NCRCAR(30,40),INDCYC(30,2),KSTAT(30
     *,4,2),CSTAT(30,4,3)
C*****
      INTEGER*2NEVTYP,      NOPEL ,       NELEMT,       NCODE          A1
      INTEGER*2NCARHL,      NCGTAG                                     A2
      INTEGER*2NTCITM,      NPRTRK,       NPRTCG,       MHEPRY         A4
      INTEGER*2MHETRK,      LDGTIM,       LDTGTM                       A4
      INTEGER*2NCRTYP,      NTKTYP,       NLSTYP,       NMHTYP         A6
      INTEGER*2IDCRAF,      IDTRUK,       IDLUS ,       IDSDVH         A6
      INTEGER*2LUSCEF,      LUSTRK,       LUSMHF,       LUSLOC         A7
      INTEGER*2LUSSTT,      LDCGTM,       LDCTTM                       A7
      INTEGER*2LCPCAR,      LTKCAR,       LSTCAR                       A8
C
C          SUBROUTINE CALLED FROM WAITRK? IF-IS MHE ALREADY FOUND?
C
      IF(ITRK.NE.0) GO TO 100
C
C          TRUCK ARRIVES AT ISS/DEPOT
C
      ISUB=IELEMT
      ITRK=IACTEL
      IMHEPL=NOPEL(IELEMT)
      ICARTP=NPRTCG(ITRK)
      ITAGTP=NCGTAG(ICARTP)
      MHETRK(ITRK)=0
```



```
      ITKTYP=IDTRUK(ITRK)
C
C          IS ACCEPTABLE MHE AVAILABLE?
C
      DO 50 I=1,NTRKPR
      IMHETP=MHEPRY(I,ITKTYP,ITAGTP)
      IF(IMHETP.EQ.0) GO TO 50
      IF(IMHETP.GT.NMHETP) GO TO 110
      IF(NMHTYP(IMHETP,IMHEPL).GT.0) GO TO 120
   50 CONTINUE
      GO TO 160
C
C          MHE ALREADY FOUND.  ASSIGN WAITING TRUCK
C
  100 ISUB=NELEMT(1)+ITRK
      ITKTYP=IDTRUK(ITRK)
C
C          IS ANY MOBILE MHE REQUIRED
C
  110 IF(IMHETP.LE.NMHETP) GO TO 120
      IMHETP=0
      GO TO 140
C
C          ASSIGN MHE TO TRUCK.
C
  120 MHETRK(ITRK)=IMHETP
      NMHTYP(IMHETP,IMHEPL)=NMHTYP(IMHETP,IMHEPL)-1
      DO 130 I=1,NCARTP
  130 MHECAR(IMHETP,IMHEPL,I)=MHECAR(IMHETP,IMHEPL,I)+LTKCAR(ITRK,I)
C
C          UNLOAD TRUCK
C
  140 CALL TKUNLD(ITRK,LTIME)
C
C          UPDATE STATISTICS.
C
      IWAIT=0
      IF(NCLOCK(ISUB).LT.0)IWAIT=MTIME+NCLOCK(ISUB)
      ITEMP=NTKCUM(ITRK,1)+1
      JTEMP=MTIME+LTIME
      WRITE(NTAPE2,150)NCODE(8),ITEMP,ITRK,JTEMP,IMHEPL,LTIME,IWAIT
  150 FORMAT(1X,I2,1117)
      NTKCUM(ITRK,7)=NTKCUM(ITRK,7)+LTIME
      IF(IMHETP.EQ.0) GO TO 160
      MHECUM(IMHETP,IMHEPL,3)=MHECUM(IMHETP,IMHEPL,3)+LTIME
C
C          GENERATE EVENT 9- TRUCK LEAVES ISS/DEPOT.
C
  160 NCLOCK(ISUB)=JTEMP
      NEVTYP(ISUB)=9
      OTIME=IWAIT/3600.
      OTIME1=LTIME/3600.
      WRITE(NTAPE1,170)OTIME,ITRK,IMHEPL,IMHETP,OTIME1
  170 FORMAT(1X,13HAFTER WAITING,F 6.2,14H HOURS, TRUCK,I4,9H AT AREA,I
     *3,15H WITH MHE TYPE,I4,12H UNLOADS IN,F6.2,6H HOURS.)
      GO TO 1000
```

```
C
C           TRUCK WAITS FOR MHE.
C
 500 NCLOCK(ISUB)=-MTIME
     WRITE(NTAPE,510)ITRK,IMHEPL
 510 FORMAT(1X,13HNO MHE- TRUCK,I4,15H  WAITS AT AREA,I3)
1000 RETURN
     END
```



```
      SUBROUTINE EVNT12
C
C           EVNT12- TRUCK ARRIVES AT TRUCK QUEUE, PLACES TRUCK IN
C           QUEUE AND SEARCHES FOR A TRUCK ASSIGNMENT.
C
C*****
C
      COMMON/A01/NCLOCK(100),NEVTYP(100),NOPEL(100),NELEMT(6),NCODE(20),
     .          NCLKEL,NLSTEL,MTIME,IEVTYP,IELEMT,IACTEL,INTCUM,INTPET,
     .LPTIME,LOTIME,NPRINT,NTAPE,NCARD,NTAPE1,NTAPE2,IOUT,NTAPE3
C
      COMMON/A04/TRUKWT(10),TRUKVL(10),TRUKSP(10,2),TCITM(10,40),NPRTRK
     .(10,13),NPRTCG(30),MHEPRY(10,10,13),MHETRK(30),LOGTTP(13,15,10),LO
     .TGTM(13,15,10),
     .          NPRCAP,IPRTKA,ITRUCK,NTRUKQ,NTRKPF
C
      COMMON/A06/NCRTYP(10),NTKTYP(10),NLSTYP(15),NMHTYP(15,3),IDCRAF(30
     .),IDTRUK(30),IPLUS(30),IPSDVH(25),
     .          NCARTP,NCRFTP,NTRKTP,NLUSTP,NMHETP,NHTSTP,NCARHT,NMHEPL
     .,NLUS,NSI,NTAGTP
C
      COMMON/A13/NCRCUM(30,15),NTKCUM(30,9),MHECYC(15,3,2),MHECAP(15,3,
     .40),MHECUM(15,3, 4),LUSUSE(30,10),LUSCUM(30,2),NSTCUM(2,40),NHRCUM
     .(20,7),NHSCRF(20,10),NTRAFF(2),NCPCAR(30,40),INPCYC(30,2),KSTAT(30
     .,4,2),CSTAT(30,4,3)
C*****
      INTEGER*2NEVTYP,        NOPEL ,        NELEMT,        NCODE       A1
      INTEGER*2NTCITM,        NPRTRK,        NPRTCG,        MHEPRY      A4
      INTEGER*2MHETRK,        LOGTTP,        LOTGTM                     A4
      INTEGER*2NCRTYP,        NTKTYP,        NLSTYP,        NMHTYP      A6
      INTEGER*2IDCRAF,        IDTRUK,        IPLUS ,        IPSDVH      A6
      ITKTYP=IDTRUK(IACTEL)
C
C           PLACE TRUCK IN QUEUE
C
      NCLOCK(IELEMT)=-MTIME
      NTRUKQ=NTRUKQ+1
      NTKCUM(IACTEL,1)=NTKCUM(IACTEL,1)+1
      NTRAFF(1)=NTRAFF(1)-1
      WRITE(NTAPE,5) IACTEL
    5 FORMAT(1X,5HTRUCK,I4,19H  ARRIVES AT QUEUE.)
C
C           NEW TRUCK TYPE IN QUEUE.
C
      L2=NELEMT(2)-1
      DO 10 I=1,L2
      IF(ITKTYP.NE.IDTRUK(I)) GO TO 10
      IF(I.EQ.IACTEL) GOTO 10
      ISUB=NELEMT(1)+I
      IF((NCLOCK(ISUB).LT.0).AND.(NEVTYP(ISUB).EQ.12)) GO TO 1000
   10 CONTINUE
C
C           NO TRUCKS OF THIS TYPE CURRENTLY IN QUEUE. LOOK FOR TRUCK
C           ASSIGNMENT.
C
      CALL WATCRF(I,0)
```

```
C
C          TRUCK ASSIGNED YET?
C
      IF(NEVTYP(IELEMT).NE.12) GO TO 1100
C
C          NEW CRAFT ASSIGNMENT?
C
      IEVTYP=2
      CALL CLUSSL
C
C          TRUCK ASSIGNED YET?
C
      IF(NEVTYP(IELEMT).NE.12) GO TO 1000
C
C          TRUCK ASSIGNMENT TO STORAGE AREA?
C
      CALL TRKASG(6,0)
 1000 RETURN
      END
```



```
      SUBROUTINE EVNT13
C
C          EVENT 13--SD VEHICLES ARRIVE AT DEPOT.
C          CONVOY OF SD VEHICLES ARRIVES AT DEPOT. CARGO LOCATIONS AND
C          EVENT CLOCK UPDATED.
C
C*****
C
      COMMON/A01/NCLOCK(100),NEVTYP(100),NOPEL(100),NELEMT(6),NCODE(20),
     .          NELKEL,NLSTEL,NTIME,IEVTYP,IELEMT,IACTEL,INTCUM,INTPER,
     .LPTIME,LOTIME,NPRINT,NTAPE,ICARD,NTAPE1,NTAPE2,ICOUT,NTAPE3
C
      COMMON/A02/CARGWT(40),CARGVL(40),CARGCT(40),CAPHL(40),NCGTAF(4)
C
      COMMON/A06/NCRTYP(10),NTKTYP(10),NLSTYP(15),NMHTYP(15,3),IDCRAF(30
     .),IDTRUK(30),IDLUS(30),IDSDVH(20),
     .          NCARTE,NCRETP,NTRKTP,NLUSTP,NMHETP,NHTSTP,NCARHT,NMHEPL
     ..NLUS,NSI,NTACTP
C
      COMMON/A07/DIST( 9),CAPST(5),ACAPST(5),LUSCRF(30),LUSTRK(30),LUSMH
     .E(30),LUSLOC(15),LUSSTT(15),LDCGTM(15,15,10),LDCTTM(13,15,10)
C
      COMMON/A08/LCRCAR(30,40),LTKCAR(30,40),LSTCAR(3,40)
C
      COMMON/A13/NCRCUM(30,15),NTKCUM(30,9),MHECYC(15,3,2),MHECAR(15,3,
     .40),MHECUM(15,3, 4),LUSUSE(30,10),LUSCUM(30,2),NSTCUM(3,40),NHSCUM
     .(20,7),NHSCRF(20,10),NTRAFF(2),NCRCAR(30,40),INDCYC(30,2),KSTAT(30
     .,4,2),CSTAT(30,4,3)
C*****
      INTEGER*2NEVTYP,         NOPEL ,         NELEMT,         NCODE          A1
      INTEGER*2NCARHL,         NCCTAF                                         A2
      INTEGER*2NCRTYP,         NTKTYP,         NLSTYP,         NMHTYP         A6
      INTEGER*2IDCRAF,         IDTRUK,         IDLUS ,         IDSDVH         A6
      INTEGER*2LUSCRF,         LUSTRK,         LUSMHE,         LUSLOC         A7
      INTEGER*2LUSSTT,         LDCGTM,         LDCTTM                         A7
      INTEGER*2LCRCAR,         LTKCAR,         LSTCAR                         A8
      WRITE(NTAPE,10)NOPEL(IELEMT),IDSDVH(IACTEL)
   10 FORMAT(1X,5HCONVOY OF,I4,21H SD VEHICLES OF TYPE,I4,13H ARRIVES
     .AT DEPOT.)
C
C          UPDATE CARGO AT DEPOT.
C
      ISUB=IDSDVH(IACTEL)
      LSTCAR(3,ISUB)=LSTCAR(3,ISUB)+NOPEL(IELEMT)
      ACAPST(3)=ACAPST(3)+NOPEL(IELEMT)*CARGWT(ISUB)
      NTRAFF(2)=NTRAFF(2)-NOPEL(IELEMT)
C
C          UPDATE CLOCK.
C
      NELEMT(5)=NELEMT(5)-1
      NLSTEL=NLSTEL-1
      IF(IELEMT.GT.NLSTEL) GO TO 50
      DO 40 I=IELEMT,NLSTEL
      NCLOCK(I)=NCLOCK(I+1)
      NEVTYP(I)=NEVTYP(I+1)
      NOPEL(I)=NOPEL(I+1)
```

```
      ISUB=I-IELEMT+IACTEL
      INTEGER(ISUB)=ISAVE(ISUB+1)
   40 CONTINUE
   50 NCLOCK(NLSTEL+1)=-1
      NEVTYP(NLSTEL+1)=0
      NOPEL(NLSTEL+1)=0
      ISUB=NELEMT(3)+1
      INTEGER(ISUB)=0
      CALL MINCLK
      RETURN
      END
```



```
      SUBROUTINE EVNT14
C
C           PROCESSES EVENT 14--SHIP ARRIVAL. DETERMINES ROOM TYPE
C           FILLED AT ALL ARRIVING HATCH SLOTS, SETS NEW HATCH SLOT
C           STATES, AND CALLS CRAFT-HATCH SLOT SELECTION IF THERE ARE
C           ANY NEW UNOCCUPIED SLOTS.
C
C*****
C
      COMMON/A01/NCLOCK(100),NEVTYP(100),NOPEL(100),NELEMT(6),NCOLF(20),
     .           NCLKEL,NLSTEL,MTIME,IEVTYI,IELEMT,IACTEL,INTCUM,INTPER,
     .LPTIME,LOTIME,MPRINT,NTAPE,NCARD,NTAPE1,NTAPE2,ICOUT,NTAPE3
C
      COMMON/A02/CARFWT(40),CAROVL(40),CARPCT(40),ICARPL(40),NCGTAC(40)
C
      COMMON/A03/CRAFWT(10),CRAFVL(10),CRAFSP(10,4),CRAFHT(10),NCRAFM(10
     .),MULHAT(10),NCCITM(10,40),NFILF(10),CRAFFS(10)
C
      COMMON/A05/NESSHP( 5),NCHSHP( 5),IESHIP( 5),NSHHS(20),IDHSLT(20),
     .NCHCOR(20),LOCHS(20),NHATSS(20),NSTYP(20),NHATNO(20),IDCARH(20),NS
     .ROOM(20),NSTINF(20),NHATIX(100),NDCR(100),NACCES(100),NTOTAL(100),
     .NHITAB(100,40),NSSSI(5),
     .           ICHCOR,LINDEX
C
      COMMON/A06/NCRTYP(16),NTKTYP(10),NLSTYP(15),NPTTYP(15,3),IDCRAF(10
     .),IDTRUK(30),IDLUS(30),IDSDVH(20),
     .           NCARTF,NCRFTP,NTRKTP,NLUSTP,NPHETF,NHTSTP,NCARHT,NYHEEL
     .,NLUS,NSI,NTAGTP
C
      COMMON/A07/DIST( 9),CAPST(3),ACAPST(3),LUSCRF(30),LUSTRK(30),LUSHH
     .F(30),LUSLCC(15),LUSSTT(15),LDCGTM(13,15,10),LDCTTM(13,15,10)
C
      COMMON/A08/LCRCAR(30,40),LTKCAR(30,40),LSTCAR(3,40)
C
      COMMON/A09/LISTCR(30),LISTHS(24),NSORT(30),NERCAP(20),NPECHC(10,10
     .,13),
     .           NLISCR,NLISHS,ISLOT,ICRAFT
C
      COMMON/A10/MCRTM(10,10),LOALTM(10,10,13),
     .NPOT,NDECKT,PRTMPO,NRTMIS,NSMT,NSIMT,NHFLOD,NSIWT
C
      COMMON/A11/MCITEM(40),NPLAT(20),
     .           ITIME,LCTIME,JSLOT,JHATCH,WEIGHT,VOLUME,L1,L3,CCWT,CCVL
     .           ,INDEX,NCONTR,CCFS,FLOOR
C
      COMMON/A12/LUSCUL(30),NPFCCL(30),NPRLUS(15,10,13),NPRMHR(15,10,13)
     .,LUSLIS(16),LUSPTM(10,15),LUSSDT(10,15),
     .           LUSCRG,NLUSPR,LUSOPN
C*****
      INTEGER*2NEVTYP,        NOPEL ,      NELEMT,      NCODE        A1
      INTEGER*2NCARPL,        NCGTAC                                 A2
      INTEGER*2NCRAFM,        MULHAT,      NCCITM,      NFILF        A3
      INTEGER*2NESSHP,        NCHSHP,      IESHIP,      NSHHS        A5
      INTEGER*2IDHSLT,        NCHCOR,      LOCHS ,      NHATSS       A5
      INTEGER*2NSTYP ,        NHATNO,      IDCARH,      NSROOM       A5
      INTEGER*2NSTINF,        NHATIX,      NDCR  ,      NACCES       A5
```

```
      INTEGER*2NTITIAL,    NMTTAP,     NSPSI                 A5
      INTEGER*2NCRTYP,     NTKTYP,     NLSTYP,     NMHTYP    A6
      INTEGER*2IECHAF,     IPTRUK,     IDLUS ,     IDSDVH    A6
      INTEGER*2LUSCRF,     LUSTRK,     LUSMHE,     LUSLOC    A7
      INTEGER*2LUSSTT,     LOCGTM,     LOCTTM                A7
      INTEGER*2LCPCAR,     LTKCAR,     LSTCAR                A8
      INTEGER*2LISTCH,     LISTHS,     NSCRT ,     NPRCAR    A9
      INTEGER*2NFRCHC                                        A9
      INTEGER*2MCOPTM,     LOADTM                            A10
      INTEGER*2NCTTEM,     NFLAT                             A11
      INTEGER*2LUSCUE,     NFRCCG,     NPRLUS,     NPRMHE    A12
      INTEGER*2LUSLIS,     LUSHTM,     LUSSPT                A12
C
C           NAME OF EVENT
C
      WRITE(NTAPE,10) IACTEL
   10 FORMAT(1X,4HSHIP,I3,20H  ARRIVES IN SYSTEM.)
      WRITE(NTAPE2,15) NCODE(15),IACTEL,MTIME
   15 FORMAT(1X,I2,11I7)
C
C           FIND SHARED ML BOOMS,IF ANY, AND SET THEM TO 1 CARGO
C           HATCH.
C
C
C           SEARCH ALL HATCH SLOTS FOR SLOTS ON THIS SHIP.
      NCLOCK(IFLEMT)=-NCLOCK(IFLEMT)
      NEVTYP(IFLEMT)=0
      L2=NELEMT(4)
      IPR=0
      IHTS=0
C           TRANSFER TO PROCESSING ACCORDING TO SHIP TYPE.
C
      ISTYP=IDSHIP(IACTEL)
      GOTO(189,2000,19,189,5000),ISTYP
C
C           FIND LASH IN HATCH SLOT LISTS.
C
   19 CONTINUE
      L2=NELEMT(4)
      DO 20 I=1,L2
      IF(NSHPHS(I).EQ.IACTEL) GO TO 25
   20 CONTINUE
C           NO HATCH SLOT FOUND
      WRITE(NPRINT,21)IACTEL
   21 FORMAT(1X,24HDATA ERROR--NO HATCH SLOT FOR LASH,I3)
      GO TO 65
C
C     FIND CARGO HATCH
C
   25 ICHCOR=NCHCOR(I)
      NHATSS(I)=7
C
C           FIND NUMBER OF BARGES ON LASH
C
      NBARGE=LINTEX
      IF(ICHCOR.NE.NCAPHT) NBARGE=NSTIND(ICHCOR+1)-1
```



```
      NBARGE=NBARGE-NSTIND(ICHCOR)
C
C           LOOP THRU ALL SEA WALL LUS-S.
C
      LUSLIS(I)=0
      IEXCED=0
      NDELAY=0
      L2=NLUS
      DO 150 I=1,L2
      IF(IDLUS(I).NE.1) GO TO 150
C
C           SET LUS LIST IF ALL SEA WALLS ARE NOT USED.
C
      IF(IEXCED.EQ.0) GOTO 35
      IF(LUSCRF(I).NE.0) GOTO 150
      LUSLIS(I)=1
      GOTO 650
C
C           LUS IS A SEA WALL. CREATE A HATCH SLOT.
C
   35 NELEMT(4)=NELEMT(4)+1
      L1=NLSTEL-NELEMT(5)+1
      IF(NELEMT(5).EQ.0) GO TO 45
      DO 40 J=L1,NLSTEL
      NCLOCK(J+1)=NCLOCK(J)
      NEVTYP(J+1)=NEVTYP(J)
   40 NOPEL(J+1)=NOPEL(J)
   45 NLSTEL=NLSTEL+1
      ISLOT=NELEMT(4)
      IDHSLT(ISLOT)=6
      LOCHS(ISLOT)=6
      NHATSS(ISLOT)=0
      NHATNO(ISLOT)=1
      NSHPHS(ISLOT)=IACTEL
      NCHCOR(ISLOT)=ICHCOR
C
C           IS SEA WALL OCCUPIED?
C
      IF(LUSCRF(I).NE.0) GO TO 60
C
C           SEA WALL NOT OCCUPIED, ASSIGN A BARGE.
C
      LUSCRF(I)=101+NDELAY
      LUSOPN=LUSOPN-1
      NCLOCK(L1)=MTIME+LUSHTM(ICRFTP+1,1)+NDELAY*FHOT
      NEVTYP(L1)=11
      NOPEL(L1)=NDELAY+NSTIND(ICHCOR)
      NDELAY=NDELAY+1
      OTIME=NCLOCK(L1)/3600.
      WRITE(NTAPE,50)NDELAY,I,OTIME,ISLOT
   50 FORMAT(1X,5HBARGE,I4,6H  AT LUS,I4,15H  CAN UNLOAD AT,F6.2,14H  HO
     .URS--SLOT,I4)
C
C           CHECK FOR MORE BARGES.
C
      IF(NDELAY.GE.NBARGE) IEXCED=1
```

```
      GO TO 150
C
C            SET WALL IS OCCUPIED.
C
   60 NCLOCK(L1)=-MTIME
      NEVTYP(L1)=-11
      NOPEL(L1)= 0
  150 CONTINUE
      GO TO 650
  189 CONTINUE
  190 DO 500 I=1,L
      IF(NSHPHS(I).NE.IACTEL) GO TO 500
C           HATCH SLOT I IS ON THIS SHIP.
      IPR=IPR+1
      ICLKEL=NCLKEL+NELEMT(3)+I
      NCLOCK(ICLKEL)=-MTIME
      NEVTYP(ICLKEL)=0
C           IS HATCH SLOT TYPE A "GENERAL CARGO SHIP?"
      IF(ITHSLT(I).NE.1) GOTO 430
C
C           FIND CORRESPONDING CARGO HATCH
      ICHCOR=NCHCOR(I)
C           IS HEAVY LIFT CARGO AT THIS CARGO HATCH?
      ITYPE=NPCCAP(ICHCOR)
      IF(NCARHL(ITYPE).EQ.1) GOTO 200
C
C           NO HEAVY LIFT CARGO AT THIS HATCH SLOT. SET BOOM TYPE TO
C           15 TON. SLOT IS "UNOCCUPIED."
C
C
  198 NOPEL(ICLKEL)=15
      GO TO 440
C
C           HEAVY LIFT CARGO. SET BOOM TYPE TO 60 TON IF NOT ALREADY
C           RIGGED.
C
  200 IF(IBOOM(ICHCOR).EQ.0) GO TO 198
C
C           60 TON BOOM IS SHARED. IS IT ALREADY RIGGED? FIRST FIND
C           HATCH SLOTS CORRESPONDING TO BOOM-SHARING CARGO HATCH
C
      IF(I.EQ.1) GOTO 230
      L7=I-1
      DO 220 J=1,L7
      IF((ICHCOR.EQ.(ICHCOR).NE.NCHCOR(J)).AND.(ICHCOR.NE.NCHCOR(J))) GO TO
     .220
      JCLKEL=NCLKEL+NELEMT(3)+J
      IF(NOPEL(JCLKEL).EQ.60) GOTO 250
  220 CONTINUE
C
C           60 TON BOOM HAS NOT YET BEEN RIGGED. RIG IT.
C
  230 NOPEL(ICLKEL)=60
      GO TO 440
C
C           60 TON BOOM HAS ALREADY BEEN RIGGED. 15 TON BOOM IS RIGGED
```



```
C           AND SLOT IS "CLOSED".
  250 NOPEL(ICLKEL)=15
      NHATSS(I)=2
      GO TO 491
C
C           HATCH SLOT TYPE IS A CAUSEWAY. SET HATCH SLOT TO CLOSED
C           AND ADD AN LUS TO LIST.
C
C
C      BOOM TYPE=0
C
  430 NOPEL(ICLKEL)=0
C
C           IS SHIP AT A CAUSEWAY?
C
  440 IF(LOCHS(I).NE.5) GO TO 490
  450 NLUS=NLUS+1
      IDLUS(NLUS)=I
      LUSCRE(NLUS)=1
      LUSTRK(NLUS)=0
      LUSMHE(NLUS)=0
      NHATSS(I)=0
      NCLOCK(ICLKEL)= MTIME
      NEVTYP(ICLKEL)=10
      NHATNO(I)=NLUS
      GO TO 491
C
C           HATCH SLOT IS UNOCCUPIED
C
  490 NHATSS(I)=4
      NEVTYP(ICLKEL)=-1
      NCLOCK(ICLKEL)=-MTIME
      IHTS=1
C
C      WRITE NEW BOOM AND HATCH SLOT RIGGING.
C
  491 WRITE(NTAPE,492)I,NCHCOR(I),NHATSS(I),NOPEL(ICLKEL)
  492 FORMAT(1X,10HHATCH SLOT,I3,10H  AT CARGO HATCH,I3,11H  HAS STATE,I
     .4,15H  AND BOOM TYPE,I3)
C
C      ANY MORE HATCH SLOT ON ARRIVING SHIP.
C
  495 IF(IPR.GE.NHSSHP(IACTEL)) GO TO 550
  500 CONTINUE
      GOTO 550
C
C           SS CONTAINER SHIP
C
C           LOOP THROUGH HATCH SLOTS TO FIND SLOTS ON THIS SHIP
 2000 L2=NELEMT(4)
      DO 2100 N=1,L2
      I=N
C
C           IS SLOT ON THIS SHIP?
      IF(NSHPHS(I).NE.IACTEL) GOTO 2100
      IPR=IPR+1
```

```
C           SLOT IS ON THE SHIP.  IS SHIP AT A CAUSEWAY?
      IF(LOCHS(I).EQ.5) GOTO 189
C           IS SLOT A HELICOPTER PLATFORM?
      IF(LOCHS(I) .NE.6) GOTO 2090
C           DETERMINE CONTAINER ON HELICOPTER PLATFORM, IF APPROPRIATE
C           LOOP THROUGH CRAFT TYPES TO FIND LARGEST HELICOPTER IN
C           SYSTEM
C
 2018 WTMAX=0.
      DO 2020 J=1,NCRFTP
      IF((NCRTYP(J).EQ.0).OR.(NCRAFM(J).NE.6)) GOTO 2020
C           HELICOPTER IN SYSTEM.  IS IT LARGEST SO FAR?
      IF(WTMAX.LT.CRAFWT(J)) WTMAX=CRAFWT(J)
 2020 CONTINUE
C           HELICOPTERS AVAILABLE?
      IF(WTMAX.GT..01)  GOTO 2030
C
C           NO HELICOPTERS,CLOSE HELO. SLOT.
C
 2022 NHATSS(I)=2
      IF(ISTYP.EQ.5) GOTO 5150
      GOTO 2092
C
C           FIND CONTAINER ON PLATFORM.  LOOP THROUGH CELLS.
C
 2030 ICARHT=NCHCOR(I)
      L1=NSTINC(ICARHT)
      ILC=0
      DO 2050 J=L1,LINDEX
C
C           IS THIS INDEX AT APPROPRIATE CARGO HATCH?
C
      IF(NHATIX(J).NE.ICARHT) GOTO 2051
C           FIND HIGHEST FILLED LEVEL.
      IF(NTOTAL(J).EQ.0) GOTO 2040
      DO 2039 K=1,NCARIP
      IF(NHTTAB(J,K).EQ.0) GOTO 2039
C           CONTAINER FOUND.
 2042 IF(NPLAT(I).EQ.0) GOTO 2045
C           RESET HIGHEST PRIORITY CARGO.
      NPRCAR(ICARHT)=NHTTAB(J,K)
      GOTO 2051
C           SET CONTAINER ON PLATFORM?
 2045 ITYPE=NHTTAB(J,K)
      IF(WTMAX.GE.CARGWT(ITYPE)) GOTO 2046
      ILC=1
      GOTO 2051
C           PLACE CONTAINER ON PLATFORM.
 2046 IF(ISTYP.EQ.5) GOTO 5140
      NPLAT(I)=ITYPE
      NHTTAB(J,K)=0
      NTOTAL(J)=NTOTAL(J)-1
C           RESET CARGO?
      IF(ILC.EQ.0) GOTO 2029
      GOTO 2090
 2039 CONTINUE
C           CELL EMPTY.  WRITE ERROR MESSAGE.
 2040 WRITE(NERIST,2041) ICARHT,J
 2041 FORMAT(1X,35HDATA ERROR--CARGO HATCH,I3,6H  CELL,I4,11H  IS EMPTY.
     .)
 2050 CONTINUE
 2051 IF(NPLAT(I).EQ.0) GOTO 2022
C
C           OPEN HATCH SLOT
C
      IF(ISTYP.EQ.5)GOTO 2022
 2090 NHATSS(I)=4
      IHIS=1
C
C           RESET HATCH SLOT CLOCK.
C
 2092 ICLKEL=NCLKEL+NELEMT(3)+1
      NCLOCK(ICLKEL)=-MTIME
      NEVTYP(ICLKEL)=0
      IF(NHATSS(I).EQ.4) NEVTYP(ICLKEL)=-1
      NOPEL(ICLKEL)=0
      WRITE(NTAPE,2093) I,NCHCOR(I),NHATSS(I)
 2093 FORMAT(2X,10HHATCH SLOT,I3,16H  AT CARGO HATCH,I3,11H  HAS STATE,I
     .3)
C
C           MORE SLOTS ON ARRIVING SHIP?
C
      IF(IPR.GE.NHSSHP(IACTEL)) GOTO 550
 2100 CONTINUE
      GOTO 550
C
C           NSS CONTAINER SHIP
C
C
C           LOOP THROUGH SLOTS TO FIND SLOTS ON THIS SHIP
 5000 L2=NELEMT(4)
      IHELO=0
      DO 5100  I=1,L2
C           IS SLOT ON THIS SHIP?
      IF(NSHPHS(I).NE.IACTEL) GOTO 5100
C           SLOT IS ON THE SHIP.  IS SHIP AT A CAUSEWAY?
      IF(LOCHS(I).EQ.5) GOTO 189
C           SET HATCH SLOT STATE TO CLOSED
      NHATSS(I)=2
      ICLKEL=NCLKEL+NELEMT(3)+1
      NCLOCK(ICLKEL)=-MTIME
      NEVTYP(ICLKEL)=0
      NOPEL(ICLKEL)=0
      IF((IHELO.EQ.0).AND.(LOCHS(I) .EQ.6)) IHELO=1
      WRITE(NTAPE,2093) I,NCHCOR(I),NHATSS(I)
 5100 CONTINUE
C
C           IS SEA ISLAND AVAILABLE?
C
      IF(NSI.GT.0) GOTO 5200
C           NO SEA ISLAND.  OPEN FIRST HELICOPTER
C           SLOT.
```

```
      IF(IHELO.EQ.0) GOTO 550
C                FIND CARGO AT HELICOPTER SLOT.
      I=IHELO
      GOTO 2010
C
C                RETURN FROM SS ROUTINE.  IS CONTAINER
C                SNATCHABLE?
 5140 IF((W.GT.WT[illegible](ICARFT)).AND.(LOCHS(I).EQ.8)) GOTO 2050
      NPLAT(I)=ITY
      NHATSS(I)=4
      IHTS=1
      WRITE(NTAPE,[illegible]) I,NCHCOR(I),NHATSS(I)
C
C                RESET HATCH SLOT CLOCK.
C
 5150 ICLKEL=NCLKEL+NELEMT(3)+1
      IF(NHATSS(I).EQ.4) NEVTYP(ICLKEL)=-1
      GOTO 550
C
C                SEA ISLAND AVAILABLE.
C
 5200 CALL SHOMOV
      GOTO 550
C
C                ASSIGN CRAFT TO ANY NEW UNOCCUPIED HATCH SLOTS.
C
  550 IF(IHTS.NE.1) GOTO 600
C
      CALL ASSCRT
      CALL CHATSL
  600 CONTINUE
  650 CALL MINOLP
 9999 RETURN
      END
```



```
      SUBROUTINE EVNT15
C
C                EVENT 15--HATCH SLOT OPENS.  RESETS HATCH SLOT FOR NEW
C                ITEMS, OR FOR CONTAINER PLACED ON HELICOPTER PLATFORM, ETC.
C                CALLS CRAFT-HATCH SLOT SELECTION IF HATCH SLOT CAN STAY
C                OPEN-I.E. HATCH SLOT STATUS IS RESET TO *UNOCCUPIED.*
C
C*****
C
      COMMON/A01/NCLOCK(100),NEVTYP(100),NOPEL(100),NELEMT(6),NCODE(20),
     *           NCLKEL,NLSTEL,NTIME,IEVTYP,IELEMT,IACTEL,INTCUM,INTPER,
     *LPTIME,LOTIME,NPRINT,NTAPE,NCARD,NTAPE1,NTAPE2,ICOUT,ITAPE
C
      COMMON/A02/CARGWT(40),CARGVL(40),CARGFT(40),NCARPL(40),NCSTAT(40)
C
      COMMON/A03/CRAFWT(10),CRAFVL(10),CRAFSP(10,4),CRAFHT(10),NCRAFM(10
     *),MULHAT(10),NCCITM(10,40),NPILE(10),CRAFFS(10)
C
      COMMON/A05/NESSHP(5),NCHSHP(5),IDSHIP(5),NSHPHS(20),IOHELT(20),
     *NCHCOR(20),LOCHS(20),NHATSS(20),NSTYP(20),NHATNO(20),IDCASH(20),NS
     *ROOM(20),NSTINI(20),NHATIX(100),NDCH(100),NACCES(100),NTOTAL(100),
     *NHTTAB(100,40),NSSSI(5),
     *           ICPCOR,LINDEX
C
      COMMON/A06/NCRTYP(10),NTKTYP(10),NLSTYP(15),NPHTYP(15,5),IDCRAF(30
     *),IDTRUK(30),IFLLUS(30),IDSDVH(20),
     *           NCARTP,NCRFTP,NTRKTP,NLUSTP,NPHETP,NHTSTP,NCARHT,NMHELI
     *,NLUS,NSI,NTAGTP
C
      COMMON/A07/DIST(5),CAPST(3),ACAPST(3),LUSCRF(30),LUSTRK(30),LUSMH
     *F(30),LUSLC(15),LUSSTT(15),LDCGTM(13,15,10),LDCTTM(13,15,10)
C
      COMMON/A09/LISTCR(30),LISTHS(24),NSORT(30),NERCAP(20),[illegible](13,10
     *,13),
     *           NLISCR,NLISHS,ISLOT,ICRAFT
C
      COMMON/A11/NCITEM(40),NPLAT(20),
     *           ITIME,LDTIME,ISLOT,JHATCH,WEIGHT,VOLUME,L1,L2,CCAT,CCVL
     *           ,INDEX,NCONTR,CCFS,FLOOR
C*****
      INTEGER*2NEVTYP,       NOPEL ,       NELEMT,       NCODE        A1
      INTEGER*2NCARPL,       NCSTAT                                   A2
      INTEGER*2NCRAFM,       MULHAT,       NCCITM,       NPILE        A3
      INTEGER*2NESSHP,       NCHSHP,       IDSHIP,       NSHPHS       A5
      INTEGER*2IOHELT,       NCHCOR,       LOCHS ,       NHATSS       A5
      INTEGER*2NSTYP ,       NHATNO,       IDCASH,       NSROOM       A5
      INTEGER*2NSTINI,       NHATIX,       NDCH  ,       NACCES       A5
      INTEGER*2NTOTAL,       NHTTAB,       NSSSI                      A5
      INTEGER*2NCRTYP,       NTKTYP,       NLSTYP,       NPHTYP       A6
      INTEGER*2IDCRAF,       IDTRUK,       IFLLUS,       IDSDVH       A6
      INTEGER*2LUSCRF,       LUSTRK,       LUSMHF,       LUSLC        A7
      INTEGER*2LUSSTT,       LDCGTM,       LDCTTM                     A7
      INTEGER*2LISTCR,       LISTHS,       NSORT ,       NERCAP       A9
      INTEGER*2NIRCHC                                                 A9
      INTEGER*2NCITEM,       NPLAT                                    A11
      IFLAG=0
```

```
      NEVTYP(IFLEMT)=
      NCLOCK(IFLEMT)=-1
      WRITE(NTAPE,6)
    6 FORMAT(1X,UPDATE SLOT  PENS EVENT)
C
C          NSS CONTAINER SHIP SLOT OPENING?
C
      ISHIP=NSHPPS(IACTEL)
      ISTYP=INSHIP(ISHIP)
      IF(ISTYP.NE.5) GOTO 1P
C
C          NSS CONTAINER SHIP.  FIND HIGHEST PRIORITY CARGO TYPE.
C
      IF(LOCHS(IACTEL).EQ.7)  GOTO 1050
C          HELICOPTER SLOT.  FIND LARGEST HELICOPTER IN SYSTEM.
      WTMAX=0.
      DO 1 10 I=1,NCRFTP
      IF((NCHARM(I).NE.F).OR.(CCRTYP(I).EQ.0).OR.(CRAFWT(I).LE.WTMAX))
     . GOTO 1010
      WTMAX=CRAFWT(I)
 1010 CONTINUE
      IF(WTMAX.GT..0001) GOTO 1050
      NHATSS(IACTEL)=2
      WRITE(NTAPE,1020) IACTEL,NHATSS(IACTEL)
 1020 FORMAT(1X,UPDATE SLOT,I3,11H  HAS STATE,I3,35H  BECAUSE NO HELIC
     .OPTERS IN SYSTEM.)
      NCLOCK(IFLEMT)=-MTIME
      NEVTYP(IFLEMT)=0
      GOTO 1P
C          FIND HIGHEST PRIORITY SNATCHABLE CONTAINER COMPATIBLE WITH
C          LARGEST HELICOPTER, OR FIND HIGHEST PRIORITY CONTAINER FOR
C          WATER-CRAFT SLOT.
C
 1050 ICHCOR=NCHCOR(IACTEL)
      INDEX=NSTING(ICHCOR)
      ICARTP=
      JFLAG=1
      DO 1100 I=INDEX,LINDEX
      IF(NHATIY(I).NE.ICHCOR) GOTO 1110
      IF(NTOTAL(I).EQ.0) GOTO 1120
      KFLAG=0
      DO 1 90 J=1,ICARTP
      IF(NHITAB(I,J).GT.0) GOTO 1070
      IF(KFLAG.EQ.1) GOTO 1100
      GOTO 10
C
C          CELL AND LEVEL FILLED.  FOR WATER-CRAFT SLOT, CONTAINER IS
C          FOUND.
 1070 JFLAG=0
      IF(LOCHS(IACTEL).EC.8) GOTO 1080
      IF(LOCHS(IACTEL).EQ.7) GOTO 1082
      ICARTP=NITTAB(I,J)
      GOTO 111
C
C          HELICOPTER SLOT.  IS CONTAINER SNATCHABLE?
C
```



```
 1080 IF(    (ICHCOR).LT.0) GOT  1100
C          CONTAINER SNATCHABLE.  IS IT LIGHT ENOUGH?
 1082 ITYP=NHITAB(I,J)
      JFLAG=
      IF(CARG.(ITYPE).LT.WTMAX)GOTO 1100
C          CONTAINER FOUND FOR HELICOPTER SLOT.
      ICARTP=NHITAB(I,J)
      GOTO 111
 1090 CONTINUE
 1100 CONTINUE
C
C          CONTAINER FOUND, IF ANY.
C
 1110 IF(LOCHS(IACTEL).NE.8) NPECAR(ICHCOR)=ICARTP
      IF(LOCHS(IACTEL).EQ.8) NFLAT(IACTEL)=ICARTP
      IF(ICARTP.NE.0) GOTO 20
C          CARGO NOT FOUND.  SET SLOT TO EMPTY, IF APPROPRIATE.
      IF((LOCHS(IACTEL).EQ.8).AND.(JFLAG.EQ.0)) GOTO 1120
C          SET SLOT TO EMPTY.
      NHATSS(IACTEL)=3
      NCLOCK(IFLEMT)=-MTIME
      NEVTYP(IFLEMT)=0
      WRITE(NTAPE,80) IACTEL,NHATSS(IACTEL),NOPEL(IFLEMT)
C
C          IF WATER-CRAFT SLOT IS EMPTY SO IS HELICOPTER SLOT
C
      IF(LOCHS(IACTEL).GE.8) GOTO 1130
      L2=NFLEMT(4)
      L1=IACTEL+1
      DO 1115 I=L1,L2
      IF(ICHCOR.EQ.NCHCOR(I)) GOTO 1118
 1115 CONTINUE
      GOTO 1130
C
C          SET HELO. SLOT TO EMPTY.
C
 1118 NHATSS(I)=3
      ICLKEL=NCLKEL+NFLEMT(3)+1
      NCLOCK(ICLKEL)=-MTIME
      NEVTYP(ICLKEL)=0
      WRITE(NTAPE,80) I,NHATSS(I),NOPEL(ICLKEL)
      GOTO 1130
C
C          SET HELO. SLOT TO CLOSED.
C
 1120 NHATSS(IACTEL)=2
      NCLOCK(IFLEMT)=-MTIME
      NEVTYP(IFLEMT)=0
      WRITE(NTAPE,80) IACTEL,NHATSS(IACTEL),NOPEL(IFLEMT)
C
C          FIND NEW NSS CONTAINER SHIP SLOT.
C
 1130 CALL FNSSHS(IACTEL,JFLAG)
C
C          TEST FOR SHIP DEPARTURE.
C
```

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      IF(IFLAG.NE.1) GOTO 75
      IFL=IACTEL
      CALL HOTEL
      T  ZH
C
C            TRANSFER TO PROCESSING ACCORDING TO PRESENT HATCH SLOT
C            STATE.
C
   18 ISTAT= (IACTEL)
      GO TO (1,10,20, 7,10,10,50,100,100,100,100,40,100),I
C
C            SLOT CLOSED, SET TO UNOCCUPIED.
C
   20 NHATS(IACTEL)=4
      IFLAG=1
      NEVTYP(IELEMT)=-1
      NCLOCK(IELEMT)=-MTIME
C
C            IS SLOT AT A CAUSEWAY
C
      IF(LOCHS(IACTEL).NE.5) GO TO 28
      NLUS=NLUS+1
      IDLUS(NLUS)=
      LUSHAT(NLUS)=IACTEL
      LUSTRK(NLUS)=0
      LUSNOP(NLUS)=0
      NHATSS(IACTEL)=6
      NHATN(IACTEL)=NLUS
      NCLOCK(IELEMT)=MTIME
      NEVTYP(IELEMT)=12
      IFLAG=0
      GO TO 75
   28 CALL MOSORT
      GO TO 75
C
C            SLOT CLOSED AND BLOCKED, SET TO BLOCKED.
C
   30 NHATSS(IACTEL)=
      GOTO 75
C
C            SLOT SAVED FOR BLOCKING AND CLOSED, SET TO SAVED FOR BLOCK
C
   40 NHATSS(IACTEL)=
C
C     WRITE RESULTS AND CALL CRAFT-HATCH SLOT SELECTION IF REQUIRED.
C
   75 WRITE(NTAPE,80)IACTEL,NHATSS(IACTEL),NOPEL(IELEMT)
   80 FORMAT(1X,11HHATCH SLOT,I4, 15H  HAS NEW STATE,I4,15H  AND ROOM TY
     .PE,I4)
      IF(IFLAG.EQ.1) CALL CHATSU
C
C            HELICOPTER SLOT AT SS CONTAINER SHIP?
C
      IF((ISTYP.NE.2).OR.(LOCHS(IACTEL).NE.8))GOTO 200
      IF(IFLAG.NE.1) GOTO 200
C            HELICOPTER ASSIGNED?
```

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      IF(  ST  (IACTEL).EQ.16) GO TO 200
C
C            ENTRY IS FREE FOR WATER-CRAFT SLOT.  FIND WC SLOT.
C
      ICHOOR=ICHOOR(IACTEL)
      I2=NELEMT(6)
      DO 1200 I=1,I2
      IF((NSHIPS(I).EQ.ISHIP).AND.(ICHOOR.EQ.NCHOOR(I)).AND.(IACTEL.NE.I
     .)) GOTO 1220
 1200 CONTINUE
      GOTO 200
C
C            WATER-CRAFT SLOT FOUND.  IS IT OCCUPIED?
C
 1220 IF(NHATSS(I).NE.13) GOTO 1250
      ICRAFT=NHATN(I)
C
C            GENERATE EVENT 19 FOR CRAFT AT WC SLOT.
C
      NCLOCK(ICRAFT)=MTIME
      NEVTYP(ICRAFT)=19
      NOPEL(ICRAFT)=I
      GOTO 200
C
C            IS WC SLOT EMPTY?
C
 1250 IF(NHATSS(I).EQ.7) GOTO 200
      ICLKEL=NCLELL+NELEMT(3)+1
      NCLOCK(ICLKEL)=MTIME
      NEVTYP(ICLKEL)=15
      NOPEL(ICLKEL)=I
      GO TO 200
C
C            ERROR PRINTOUT--IMPROPER HATCH SLOT STATE.
C
  100 WRITE(NPRINT,110)
  110 FORMAT(1X,50HIMPROPER HATCH SLOT STATE.  PRINT DEBUG INFO AND CONT
     .INUE.)
      CALL WCLOCK
  200 CALL MINCLK
      RETURN
      END
```

```
      SUBROUTINE EVNT19
C
C            EVENT 19--CRAFT LEFT AT HATCH SLOT.  ENTRY AT SHARED SS
C            CONTAINER SHIP HATCH DISCHARGES 1 CONTAINER TO WATER-
C            CRAFT, IF APPROPRIATE.
C
C*****
C
      COMMON/A01/NCLOCK(100),NEVTYP(100),NOPEL(100),NELEMT(6),NCODE(20),
     .              NCLREL,NESTEL,MTIME,IEVTYP,IELEMT,IACTEL,INTCUM,INTPCR,
     .LPTIME,LOTIME,NESINT,NTAPE,NCARD,NTAPE1,NTAPE2,IOUT,NTAPE3
C
      COMMON/A02/CARCWT(40),CARGVL(40),CARCCT(40),NCARHL(40),NCGTAG(40)
C
      COMMON/A03/CRAFWT(10),CRAFVL(10),CRAFSP(10,4),CRAFHT(10),NCRAFM(10
     .),MULHAT(10),NCCITM(10,40),NFILE(10),CRAFES(10)
C
      COMMON/A05/NESSEL( 5),NCHSHP( 5),IDSHIP( 5),NSHPHS(20),IDHSLT(20),
     .NCHCOR(20),LOCHS(20),NHATSS(20),NSTYP(20),NHATNO(20),IDCARH(20),NS
     .HOOM(20),NSTLAD(20),NHATIX(100),NDCB(100),NACCES(100),NTOTAL(100),
     .NHTTAB(100,40),NSSSI(5),
     .              ICHCOR,LINDEX
C
      COMMON/A06/NCRTYP(10),NTKTYP(10),NLSTYP(15),NMHTYP(15,3),IDCRAF(30
     .),IDTRUK(30),IDLUS(30),IDSDVH(20),
     .              NCARTP,NCRFTP,NTRKTP,NLUSTP,NMHFTP,NHTSTP,NCARHT,NMHFPL
     .,NLUS,NS1,NTACTP
C
      COMMON/A08/LCRCAR(30,40),LTKCAR(30,40),LSTCAR(3,40)
C
      COMMON/A09/LISTCH(30),LISTHS(24),NSORT(30),NPRCAR(20),NPRCHC(10,10
     .,10),
     .              LISTCH,NLISHS,ISLOT,ICRAFT
C
      COMMON/A11/NCITEM(40),NPLAT(20),
     .              ITIME,LDTIME,ISLOT,JHATCH,WEIGHT,VOLUME,L1,L3,CCWT,CCVL
     .              ,INDEX,NCONTE,CCFS,FLOOR
C*****
      INTEGER*2NEVTYP,          NOPEL ,         NELEMT,         NCODE          A1
      INTEGER*2NCARHL,          NCGTAG                                         A2
      INTEGER*2NCRAFM,          MULHAT,         NCCITM,         NFILE          A3
      INTEGER*2NESSEL,          NCHSHP,         IDSHIP,         NSHPHS         A4
      INTEGER*2IDHSLT,          NCHCOR,         LOCHS ,         NHATSS         A5
      INTEGER*2NSTYP ,          NHATNO,         IDCARH,         NSHOOM         A6
      INTEGER*2NSTLAD,          NHATIX,         NDCB  ,         NACCES         A7
      INTEGER*2NTOTAL,          NHTTAB,         NSSSI                          A8
      INTEGER*2NCRTYP,          NTKTYP,         NLSTYP,         NMHTYP         A7
      INTEGER*2IDCRAF,          IDTRUK,         IDLUS ,         IDSDVH         A8
      INTEGER*2LCRCAR,          LTKCAR,         LSTCAR                         A8
      INTEGER*2LISTCH,          LISTHS,         NSORT ,         NPRCAR         A9
      INTEGER*2NPRCHC                                                          A9
      INTEGER*2NCITEM,          NPLAT                                          A11
      ISLOT=NOPEL(IELEMT)
      IHATCH=NCHCOR(ISLOT)
      ISLTYP=IDHSLT(ISLOT)
      ICRTYP=IDCRAF(IACTEL)
      CTIME=MTIME/60.
      WRITE(NTAPE,1) IACTEL,ISLOT,CTIME
    1 FORMAT(1X,5HCRAFT,I4,16H AT HATCH SLOT,I4,20H  READY FOR LOADING
     .AT,F7.2,6H  HOURS.)
C
C            FIND SHARED HELICOPTER PLATFORM.
C
      IF(ISLOT.EQ.NELEMT(4)) GOTO 40
      IF(NCHCOR(ISLOT+1).NE.IHATCH) GOTO 40
      LSLOT=ISLOT+1
C
C            DOES HELICOPTER PLATFORM HAVE A CONTAINER?
C
      IF(NPLAT(LSLOT).GT.0) GOTO 120
C
C            HELICOPTERS IN SYSTEM?
C
      DO 10 I=1,NCRFTP
      IF((NCRTYP(I).GT.0).AND.(NCRAFM(I).EQ.1)) GOTO 50
   10 CONTINUE
C
C            ERROR PRINTOUT.
C
   40 WRITE(NPRINT,45)
   45 FORMAT(1X,24HLOGIC ERROR--EVENT 19 SHOULD NOT HAVE BEEN GENERATED.
     .)
      GOTO 120
C
C            SEARCH FOR CONTAINER FOR HELICOPTER PLATFORM.
C
   50 MFLAG=0
      KCRAFT=0
      CALL HELFLT(MFLAG,LSLOT,KCRAFT)
C
C            PROCESS ACCORDING TO SEARCH RESULTS.
C
      GOTO (140,120,1000),MFLAG
C
C            WATER-CRAFT SLOT EMPTY?
C
  120 IF(NHATSS(ISLOT).NE.0) GOTO 300
C
C            SLOT EMPTY.  TERMINATE LOADING.
C
  140 JTIME=MTIME
  150 ITIME=NPLAT(ISLOT)
      LDTIME=JTIME-ITIME
      ICRAFT=IACTEL
      CALL LENDIT(ICRTYP,ISLTYP)
      GOTO 1000
C
C            SLOT NOT EMPTY.  FIND PARAMETERS ALL FREIGHT CRAFT LOAD.
C
  300 NHATSS(ISLOT)=10
      ICRAFT=IACTEL
      LDTIME=0
```

```
      JSLOT=ISLOT
      JHATCH=IHATCH
      WEIGHT=CRAFWT(ICRTYP)
      VOLUME=CRAFVL(ICRTYP)
      DO 310 I=1,NCARTF
310   NCITEM(I)=NCCITM(ICRTYP,I)
      L2=LINDEX
      IF(JSLOT.LT.NELEMT(4)) L2=NSTINO(JHATCH+1)-1
      L1=NSTINO(JHATCH)
      DO 320 I=L1,L3
      IF(NTOTAL(I).GT.0) GOTO 330
320   CONTINUE
330   L1=I
      CCWT=0.
      CCVL=0.
      NCONTR=0
      DO 340 I=1,NCARTF
      CCWT=CCWT+CARGWT(I)*LCRCAR(ICRAFT,I)
      CCVL=CCVL+CARGVL(I)*LCRCAR(ICRAFT,I)
340   NCONTR=NCONTR+LCRCAR(ICRAFT,I)
C
C              LOADING ROUTINE TO LOAD ONE CONTAINER.
C
      NUM= NCONTR
      CALL LOCONS
C
C              CONTAINER LOADED?
C
      IF( NUM.EQ.NCONTR) GOTO 140
C              HATCH EMPTY?
      IF(NIPCAR(IHATCH).EQ.0) GOTO 380
C
C              GENERATE ANOTHER EVENT 1? FOR THIS CRAFT.
C
      NCLOCK(IFLEMT)=MTIME+LDTIME
      NEVTYP(IFLEMT)=15
      GOTO 1000
C
C              SET HATCH SLOT *EMPTY.*
C
380   NHATSS(ISLOT)=0
      NHATSE(ISLOT)=0
      JTIME=MTIME+LDTIME
      GOTO 150
1000  CALL MINCLK
      CALL HSSCRT
      RETURN
      END
```



```
      SUBROUTINE HSSCRT(ISLOT,IFLAG)
C
C              FIND NEW HATCH SLOT FOR NSS CONTAINER SHIP--WHEN SEA
C              ISLAND IS MOVED OR HELICOPTER SLOT BECOMES EMPTY, ACTIVE
C              HELICOPTER AND WATER-CRAFT SLOTS ARE FOUND.
C              IFLA =1, EXAMINE SHELF UPON RETURN.
C*****
C
      COMMON/A01/NCLOCK(100),NEVTYP(100),NEEL(100),NELEMT(6),NCODE(20),
     .          NCLKEL,NLSTEL,MTIME,IEVTYP,IFLEMT,IACTEL,INTCUM,INTOPN,
     .LPTIME,LDTIME,NPRINT,NIAEL,NCARD,NTAPE1,NTAPE2,ICOUT,NTAPE3
C
      COMMON/A02/CARGWT(40),CARGVL(40),CARGLT(40),NCARFL(40),NCSTAT(40)
C
      COMMON/A03/CRAFWT(10),CRAFVL(10),CRAFSP(10,4),CRAFHT(10),NCRAFM(10
     .),MULHAT(10),NCCITM(10,40),NFILE(10),CRAFFS(10)
C
      COMMON/A05/NESSHP( 5),NCHSHP( 5),IDSHIP( 5),NSHOHS(20),IDHSLT(20),
     .NCHCOR(20),LOCHS(20),NHATSS(20),NSTYP(20),NLATNO(20),IDCARH(20),NS
     .ROOM(20),NSTINO(20),NHATIX(100),NDCH(100),NACCES(100),NTOTAL(100),
     .NHTTAB(100,40),NSSSI(5),
     .          ICHCOR,LINDEX
C
      COMMON/A06/NCSTYP(10),NTKTYP(10),NLSTYP(10),NMHTYP(10,3),IDCRAF(50
     .),IDTRUK(30),IPLUS(30),IDSDVH(20),
     .          NCARTF,NCRFTP,NTRKTP,NLUSTP,NMHETP,NHTSTP,NCAPLT,NMHPL
     .,NLUS,NSI,NTAGTP
C
C          COMMON A09 IS NON-STANDARD
      COMMON/A09/LISTCR(80),LISTDU(24),NSORT(30),NRCHR(20),NERCHC(10,10
     .,13),
     .          NLISCR,NLISHS,LSLOT,ICRAFT
C
      COMMON/A10/MPORTM(10,10),LOADTM(10,10,12),
     .NPOT,NDECKE,NRTMPO,NETMIF,NSMT,NSIMT,NHELOP,NSIMT
C
      COMMON/A11/NCITEM(40),NPLAT(20),
     .          ITIME,LDTIME,JSLOT,JHATCH,WEIGHT,VOLUME,L1,L2,CCWT,CCVL
     .          ,INDEX,NCONTR,CCFS,FLOOR
C*****
      INTEGER*2NEVTYP,       NEEL ,         NELEMT,        NCODE          A1
      INTEGER*2NCARHL,       NCGTAG                                       A2
      INTEGER*2NCRAFM,       MULHAT,        NCCITM,        NFILE          A3
      INTEGER*2NESSHP,       NCHSHP,        IDSHIP,        NSHOHS         A5
      INTEGER*2IDHSLT,       NCHCOR,        LOCHS ,        NHATSS         A5
      INTEGER*2NSTYP ,       NLATNO,        IDCARH,        NSROOM         A5
      INTEGER*2NSTINO,       NHATIX,        NDCH ,         NACCES         A5
      INTEGER*2NTOTAL,       NHTTAB,        NSSSI                         A5
      INTEGER*2NCSTYP,       NTKTYP,        NLSTYP,        NMHTYP         A6
      INTEGER*2IDCRAF,       IDTRUK,        IPLUS ,        IDSDVH         A6
      INTEGER*2LISTCR,       LISTDU,        NSORT ,        NRCHR          A9
      INTEGER*2NERCHC                                                     A9
      INTEGER*2MPORTM,       LOADTM                                       A10
      INTEGER*2NCITEM,       NPLAT                                        A11
      DO 920 K=1,8
      LK=NCLKEL+NELEMT(3)*K
```

```
  900 WRITE(NTAPE,910) K,NEVTYP(K),NHATSS(K)
  910 FORMAT(1X,3I10)
      IFLAG=1
      NEWSLT=
      WRITE(NTAPE,920) ISLOT
  920 FORMAT(1X,11HISLOT START,I10)
      ISHIP=NSHPHS(ISLOT)
      IHATCH=NHCHOR(ISLOT)
      JSLOT=0
      JHATCH=0
C
C              IS SLOT A HELICOPTER SLOT?
C
      IF(LOCHS(ISLOT).EQ.8) GOTO 500
C
C              WATER-CRAFT SLOT.  FIND LAST       WATER-CRAFT SLOT  ON
C              THIS SHIP.
      L2=NFLEMT(4)
      LWCSLT=
      DO 50 I=ISLOT,L2
      IF((ISHIP.NE.NSHPHS(I)).OR.(LOCHS(I).NE.7)) GOTO 60
      LWCSLT=I
   50 CONTINUE
C
C              LOOP THROUGH WATER-CRAFT SLOTS.
C
   60 DO 400 I=ISLOT,LWCSLT
C              FIND CORRESPONDING HELICOPTER SLOT.
      L1=LWCSLT+1
      LHESLT=
      DO 100 J=L1,L2
      IF(ISHIP.NE.NSHPHS(J)) GOTO 110
      IF(NCHCOR(J).EQ.NCHCOR(I)) GOTO 105
  100 CONTINUE
      GOTO 110
  105 LHESLT=J
      WRITE(NTAPE,915) LHESLT
  915 FORMAT(1X,7HLHESLT=,I10)
C
C              NEW WATER-CRAFT SLOT FOUND YET?
C
  110 IF(NEWSLT.GT.0) GOTO 200
C              IS WATER-CRAFT SLOT EMPTY?
      IF(NHATSS(I).EQ.3) GOTO 180
C
C              SLOT NOT EMPTY.  ADD SEA IS. MOVE TIME AND GENERATE EVENT
C              15--HATCH OPENS.
C
      ISUB=NCLKEL+NFLEMT(4)+I
      NCLOCK(ISUB)=MTIME+NSIWT
      NEVTYP(ISUB)=15
      NOPEL(ISUB)=0
      NEWSLT=I
      NHATSS(I)=
      NHATNO(I)=
      WRITE(NTAPE,920) ISUB,NCLOCK(ISUB),MTIME,NSIWT
```



```
  920 FORMAT(1X,5H...,4I10)
C
C              SET HELICOPTER SLOT CLOSED.
      IF(LHESLT.EQ.0) GOTO 400
  120 NHATSS(LHESLT)=
      NHATNO(LHESLT)=
      IFLAG=0
      GOTO 400
C
C              SET HELICOPTER SLOT EMPTY.
C
  180 NHATSS(LHESLT)=3
      NHATNO(LHESLT)=0
      GOTO 400
C
C              FIND NEW HELICOPTER SLOT.
C
  200 IF(I.NE.(NEWSLT+1)) GOTO 300
C              IF HELICOPTER SLOT IS OPEN, SET CLOSED.
      IF((LHESLT.GT.0).AND.(NHATSS(LHESLT).EQ.4)) GOTO 120
      GOTO 400
C
C              IF SLOT IS CLOSED, SET OPEN.
C
  300 IF(LHESLT.EQ.0) GOTO 400
      IF(NHATSS(LHESLT).EQ.3) GOTO 400
      IFLAG=0
      IF(NHATSS(LHESLT).EQ.4) GOTO 1000
      ISUB=NCLKEL+NFLEMT(4)+LHESLT
      NHATSS(LHESLT)=4
      NHATNO(LHESLT)=0
      NCLOCK(ISUB)=MTIME+NSIWT
      NEVTYP(ISUB)=15
      NOPEL(ISUB)=0
      GOTO 700
  400 CONTINUE
      GO TO  1000
C
C              HELICOPTER SLOT.  FIND CORRESPONDING WATER-CRAFT SLOT.
C
       WRITE(NTAPE,930) ISLOT

  930 FORMAT(1X,4HHELO,I10)
  500 L3=NFLEMT(4)
      DO 550 I=1,L3
      IF(NSHPHS(I).NE.ISHIP) GOTO 550
      IF(ISLOT.EQ.I) GOTO 550
      IF(IHATCH.EQ.NCHCOR(I)) GOTO 560
  550 CONTINUE
      GOTO 620
  560 JSLOT=I
C
C              FIND HIGHEST PRIORITY CARGO TYPE FOR WATER-CRAFT SLOT.
C
  570 ICARTP=0
```

```
      L2=LINDEX
      IF(IHATCH.LT.NCARHT) L2=NSTIND(IHATCH+1)-1
      L1=NSTIND(IHATCH)
      DO 600 I=L1,L2
      IF(NTOTAL(I).EQ.0) GOTO 600
      DO 590 J=1,NCARTF
      IF(NHITAB(I,J).NE.0) GOTO 610
  590 CONTINUE
  600 CONTINUE
C
C             WATER-CRAFT SLOT IS EMPTY.
C
      NHATSS(JSLOT)=
      NHATNO(JSLOT)=0
      ISUB=NCLKEL+NELEMT(4)+JSLOT
      NCLOCK(ISUB)=-MTIME
      NEVTYP(ISUB)=0
      NOPEL(ISUB)=0
      GOTO 62
C             WATER-CRAFT SLOT IS NOT EMPTY.
  610 NPRCAR(IHATCH)=ICARTP
      IFLAG=
C
C             FIND NEW HELICOPTER SLOT.
C
  620 L1=IHSLOT+1
      IF(L1.GT.L3) GOTO 1000
      DO 650 I=L1,L3
      IF(NSHPHS(I).NE.ISHIP) GOTO 1000
      IF(NHATSS(I).EQ.3) GOTO 650
      IFLAG=
      IF(JHATCH.NE.0) GOTO 637
C
C             FIND ACTIVE WATER-CRAFT SLOT.
C
      DO 630 J=1,ISLOT
      IF((NSHPHS(J).NE.ISHIP).OR.(LOCHS(J).NE.7)) GOTO 630
      IF((NHATSS(J).EQ.4).OR.(NHATSS(J).EQ.10)) GOTO 635
      ISUB=NCLKEL+NELEMT(4)+J
      IF((NCLOCK(ISUB).GT.0).AND.(NEVTYP(ISUB).EQ.15)) GOTO 635
  630 CONTINUE
      GOTO 67
C
C             ACTIVE WC SLOT FOUND.  TOO CLOSE TO HELIC. SLOT?
C
  635 JHATCH=NCHCUR(J)
  637 IF((NCHCUR(I)-JHATCH).GE.2) GOTO 670
  650 CONTINUE
      GOTO 1000
C
C             GENERATE HATCH OPEN EVENT FOR NEW HELICOPTER SLOT.
C
  670 ISUB=NCLKEL+NELEMT(4)+I
      NCLOCK(ISUB)=MTIME
      NEVTYP(ISUB)=15
      NOPEL(ISUB)=
```



```
      LHESLT=I
C
C             FIND HIGHEST PRIORITY CARGO FOR HELICOPTER SLOT.
C
  700 WTMAX=0.
      DO 710 I=1,JCRETF
      IF((ICRTYP(I).EQ.0).OR.(NCRSEM(I).NE.0)) GOTO 710
      IF(CRAFWT(I).LE.WTMAX) GOTO 710
      WTMAX=CRAFWT(I)
  710 CONTINUE
      IF(WTMAX.LT..01) GOTO 1000
      IHATCH=NCHCUR(LHESLT)
      L1=NSTIND(IHATCH)
      L2=LINDEX
      IF(IHATCH.NE.NCARHT)  L2=NSTIND(IHATCH+1)-1
      DO 750 I=L1,L2
      IF(NTOTAL(I).EQ.0) GOTO 750
      DO 740 J=1,NCARTF
      IF(NHITAB(I,J).EQ.0) GOTO 740
      ITYPE=NHITAB(I,J)
      IF(CARGWT(ITYPE).GT.WTMAX) GOTO 750
      IF((NSROOM(IHATCH).LT.J).AND.(LOCHS(LHESLT).EQ.7)) GOTO 750
      NPLAT(LHESLT)=ITYPE
      GOTO 1000
  740 CONTINUE
  750 CONTINUE
C
C             UPDATE CLOCK, HATCH SLOT LIST.
C
 1000 DO 940 K=1,9
      L6=NCLKEL+NELEMT(3)+K
  940 WRITE(NTAPE,510) K,NEVTYP(L6),NHATSS(K)
      CALL MINCLK
      CALL HSSORT
      RETURN
      END
```

```
      SUBROUTINE HELPLT(MFLAG,LSLOT,KCRAFT)
C
C          HELICOPTER PLATFORM--PLACES A NEW CONTAINER ON THE
C          HELICOPTER PLATFORM DEFINED AS *LSLOT* AND RETURNS.
C
C          MFLAG  INDICATES RESULT OF SEARCH FOR A NEW CONTAINER.
C               1= CARGO HATCH IS EMPTY. (CONT. MAY BE ON PLATFORM.)
C               2= HELICOPTER SLOT IS CLOSED--NO APPROPRIATE
C                  CONTAINER. (HATCH NOT EMPTY)
C               3= CONTAINER SELECTED.        WATER-CRAFT SLOT NOT
C                  EMPTY.
C
C*****
C
      COMMON/A01/NCLOCK(100),NEVTYP(100),NOPEL(100),NELEMT(6),NCODE(20),
     .           IFLKFL,FLSTEL,MTIME,IEVTYP,IFLEMT,IACTEL,INTCUM,INTPER,
     .LPTIME,LSTIME,NPRINT,NTAPE,NCARD,NTAPE1,NTAPE2,ICOUT,NTAPE3
C
      COMMON/A02/CARGWT(40),CARGVL(40),CARSCT(40),FCARPL(40),NCGTAG(40)
C
      COMMON/A03/CRAFWT(10),CRAFVL(10),CRAFSP(10,4),CRAFHT(10),NCRAFM(10
     .),MULHAT(10),LOCITM(10,40),NFILE(10),CRAFFS(10)
C
      COMMON/A04/NSHIP( 5),NCHSHP( 5),IDSHIP( 5),NSHPHS(20),IDHSLT(20),
     .NCHC  5(20),LOCHS (20),NHATSS(20),NSTYP(20),NHATNO(20),IDCARH(20),NS
     .ROOM(20),NSTIME(20),NHATIX(100),NDCP(100),NACCES(100),NTOTAL(100),
     .NHTTAB(100,40),NSSSI(5),
     .          IHCHF,LINDEX
C
      COMMON/A05/NCRTYP(10),NTKTYP(10),NLSTYP(15),NMHTYP(15,3),IDCRAF(30
     .),ITRUK(30),IPLLS(30),IDSDVH(20),
     .          NCARTP,NCRFTP,NTEKTP,NLUSTP,NMHETP,NHTSTP,NCARHT,NMHEPL
     .,NIDC,NSI,NTKSTP
C
      COMMON/A09/LISTCR(30),LISTHS(24),NSORT(30),NFRCAR(20),NPRCHC(10,10
     .,15),
     .          NLISCR,NLISHS,ISLOT,ICRAFT
C
      COMMON/A10/SORTTM(10,10),LOADTM(10,10,15),
     .NEPT,NDECKD,NHTMEO,NPTMIS,NCMT,NCIMT,NHELOD,NSIUT
C
      COMMON/A11/NCITEM(40),NPLAT(20),
     .          ITIME,LLTIME,JSLOT,JHATCH,WEIGHT,VOLUME,L1,L3,CCWT,CCVL
     .          ,INDEX,FCONTR,CCFS,FLOOR
C*****
      INTEGER*2NEVTYP,         NOPEL ,        NELEMT,        NCODE         A1
      INTEGER*2NCARPL,         NCGTAG                                      A2
      INTEGER*2NCRAFM,         MULHAT,        NCCITM,        NFILE         A3
      INTEGER*2NHSHIP,         NCHSHP,        IDSHIP,        NSHPHS        A5
      INTEGER*2IDHSLT,         NCHCPS,        LOCHS ,        NHATSS        A5
      INTEGER*2NSTYP ,         NHATNO,        IDCARH,        NSROOM        A5
      INTEGER*2NSTIME,         NHATIX,        NDCP ,         NACCES        A5
      INTEGER*2NTOTAL,         NHTTAB,        NSSSI                        A5
      INTEGER*2NCRTYP,         NTKTYP,        NLSTYP,        NMHTYP        A6
      INTEGER*2IDCRAF,         ITRUK,         IPLUS ,        IDSDVH        A6
      INTEGER*2LISTCR,         LISTHS,        NSORT ,        NPRCAR        A9
```



```
      INTEGER*2NPRCHC                                                      A9
      INTEGER*2SORTIM,         LOADTM                                      A10
      INTEGER*2NCITEM,         NPLAT                                       A11
      ISHIP=NSHPHS(LSLOT)
      IHATCH=NCHCHS(LSLOT)
      IFLAG=0
      JFLAG=0
C
C     FIND WEIGHT CAPACITY OF LARGEST HELICOPTER.
C
      WTMAX=0.
      DO 10 I=1,NCRFTP
      IF((NCRTYP(I).EQ.0).OR.(NCRAFM(I).NE.0)) GOTO 10
      IF(CRAFWT(I).GT.WTMAX) WTMAX=CRAFWT(I)
   10 CONTINUE
C
C             LOOP THROUGH CELLS TO FIND NEXT MOST ACCESSIBLE CONTAINER.
C
      L1=NSTIND(IHATCH)
      L2=LINDEX
      IF(IHATCH.NE.NCARHT) L2=NSTIND(IHATCH+1)-1
      ILC=0
      DO 100 I=L1,L2
      IF(NTOTAL(I).EQ.0) GOTO 100
      IF(JFLAG.EQ.1) GOTO 120
C
C             LOOP THROUGH CONTAINER LEVELS.
C
      DO 90 J=1,NCARTP
      IF(NHTTAB(I,J).EQ.0) GOTO 90
      ICARTP=NHTTAB(I,J)
      ITAGTP=NCGTAG(ICARTP)
      IF(WTMAX.LT.CARGWT(ICARTP)) GOTO 95
C
C             NEXT MOST ACCESSIBLE CONTAINER FOR PLATFORM IS FOUND.
C
C             PLACE CONTAINER ON PLATFORM.
      NPLAT(LSLOT)=ICARTP
      NHTTAB(I,J)=0
      NTOTAL(I)=NTOTAL(I)-1
      IF(NTOTAL(I).EQ.0) GOTO 11
      NPRCAR(IHATCH)=NHTTAB(I,J+1)
      IFLAG=1
      ILC=1
C
C             GENERATE EVENT 15--HATCH OPENS--FOR HELICOPTER PLATFORM.
C             GANTRY CYCLE TIME= *HELICOPTER DELAY TIME.*
C
   11 ISUB=NCLKFL+NELEMT(3)+LSLOT
      NCLOCK(ISUB)=MTIME+NHELOD
      NEVTYP(ISUB)=15
      NOPEL(ISUB)=0
      NHATSS(LSLOT)=2
      NHATNO(LSLOT)=0
C
C             SET WATER-CRAFT SLOT TO *OCCUPIED AND CLOSED* OR TO
```

```
C        *CLOSED, BUT OCCUPIABLE.*
C
      IF((LSLOT-1).EQ.0) GOTO 40
      KSLOT=LSLOT-1
      IF((NSHPHS(KSLOT).NE.ISHIP).OR.(LOCHS(KSLOT).NE.7)) GOTO 40
      IF((NHATSS(KSLOT).EQ.4).OR.(NHATSS(KSLOT).EQ.14)) GOTO 20
      IF((NHATSS(KSLOT).EQ.10).OR.(NHATSS(KSLOT).EQ.13)) GOTO 15
      WRITE(NPRINT,12) KSLOT,NHATSS(KSLOT)
   12 FORMAT(1X,17HLOGIC ERROR--SLOT,I4,12H HAS STATE=,I4)
C
C        SET WATER-CRAFT SLOT TO *OCCUPIED AND CLOSED,* AND SET
C        CRAFT TO WAIT.
C
   15 NHATSS(KSLOT)=1?
      IWCRAF=NHATW(KSLOT)
      WCLOCK(IWCRAF)=-RTIME
      GOTO 40
C
C        SET WATER-CRAFT SLOT TO *CLOSED, BUT OCCUPIABLE.*
C
   20 NHATSS(KSLOT)=14
   40 JFLAG=1
      GOTO 1??
   90 CONTINUE
      GOTO 1?
   ?? IFLAG=1
      ILC=1
  1?0 CONTINUE
      GOTO 13?
  120 IFLAG=1
C
C        IS WATER-CRAFT SLOT EMPTY?
C
  130 IF((LSLOT-1).EQ.0) GOTO 140
      KSLOT=LSLOT-1
      IF((NSHPHS(KSLOT).NE.ISHIP).OR.(LOCHS(KSLOT).NE.7)) GOTO 140
      IF(IFLAG.EQ.1) GOTO 140
C
C        SET WATER-CRAFT SLOT EMPTY.
C
      NHATSS(KSLOT)=?
      KCRAFT=NHATW(KSLOT)
      NHATW(KSLOT)=0
      MFLAG=1
C
C        SET HELICOPTER SLOT TO EMPTY IF NO CONTAINER ON PLATFORM.
C
      IF(NPLAT(LSLOT).GT.0) GOTO 1000
      NHATSS(LSLOT)=?
      NHATSW(LSLOT)=0
      GOTO 1000
C
C        SET HELICOPTER SLOT TO *CLOSED* IF NO CONT. SELECTED AND
C        CARGO HATCH NOT EMPTY.
  140 IF(NPLAT(LSLOT).GT.0) GOTO 160
      NHATSS(LSLOT)=?
```



```
      NHATSS(LSLOT)=?
      MFLAG=2
      GOTO 1000
  160 MFLAG=3
C
C        RESET HIGHEST PRIORITY CARGO AT HATCH?
C
 1000 IF(ILC.EQ.1) GOTO 1100
      DO 1050 I=L1,L2
      IF(NTOTAL(I).EQ.0) GOTO 1050
      DO 1040 J=1,NCARTP
      IF(NHTTAB(I,J).EQ.0) GOTO 1040
      NPRCAR(IMATCH)=NHTTAB(I,J)
      GOTO 1100
 1040 CONTINUE
 1050 CONTINUE
 1100 RETURN
      END
```

```
      SUBROUTINE HSSORT
C        SORTS ALL UNOCCUPIED HATCH SLOTS FOR HATCH SLOT SELECTION
C
C           LIST.
C
C.....
C
      COMMON/A01/NCLOCK(100),NEVTYP(100),NOPEL(100),NELEMT(6),NCODE(20),
     .          NELKEL,NLSTEL,MTIME,IEVTYP,IELEMT,IACTEL,INTCUM,INTPEP,
     .LPTIME,LOTIME,NPRINT,NTAPE,NCARD,NTAPE1,NTAPE2,ICOUT,NTAPE3
C
      COMMON/A05/NSSHP( 5),NCHSHP( 5),IDSHIP( 5),NSHPHS(20),IDHSLT(20),
     .NCHCAR(20),LOCHS(20),NHATSS(20),NSTYP(20),NHATNO(20),IDCARH(20),NS
     .ROOM(20),NSTINO(20),NHATIX(100),NDCB(100),NACCES(100),NTOTAL(100),
     .NHTTAB(150,4),NSSSI(5),
     .          ICHCUS,LINDEX
C
      COMMON/A09/LISTCR(30),LISTHS(24),NSORT(30),NPRCAR(20),NPRCHC(10,13
     .,15),
     .          NLISCR,NLISHS,ISLCT,ICRAFT
C.....
      INTEGER*2NEVTYP,      NOPEL ,      NELEMT,      NCODE        A1
      INTEGER*2NSSHP,       NCHSHP,      IDSHIP,      NSHPHS       A5
      INTEGER*2IDHSLT,      NCHCAR,      LOCHS ,      NHATSS       A5
      INTEGER*2NSTYP ,      NHATNO,      IDCARH,      NSROOM       A5
      INTEGER*2NSTINO,      NHATIX,      NDCB  ,      NACCES       A5
      INTEGER*2NTOTAL,      NHTTAB,      NSSSI                     A5
      INTEGER*2LISTCR,      LISTHS,      NSORT ,      NPRCAR       A9
      INTEGER*2NPRCHC                                              A9
C
C           FIND ALL UNOCCUPIED HATCH SLOTS
C
      NLISHS=0
      L2=NELEMT(4)
      DO 50 I=1,L2
      IF((NHATSS(I).NE.4).AND.(NHATSS(I).NE.14)) GOTO 50
      NLISHS=NLISHS+1
      LISTHS(NLISHS)=I
   50 CONTINUE
      IF(NLISHS.EQ.0) GO TO 200
      IF(NLISHS.EQ.1) GO TO 180
C
C           SORT UNOCCUPIED HATCH SLOTS.
C
      L3=NLISHS-1
      IPR=NELKEL+NELEMT(4)
      DO 150 I=1,L3
      ITEMP=LISTHS(I)
      L1=I+1
      DO 140 J=L1,NLISHS
      JTEMP=LISTHS(J)
C     TEST FOR HATCH ON FAR SIDE OF GEN CARGO SHIP
      IF((LOCHS(ITEMP).GE.3).AND.(LOCHS(ITEMP).LE.2))GO TO 140
      IF((LOCHS(ITEMP).GE.3).AND.(LOCHS(JTEMP).LE.2)) GO TO 130
C
C           TEST FOR *CLOSED BUT OCCUPIABLE* CONTAINER SHIP SLOT.
```



```
C
      IF((NHATSS(ITEMP).EQ.14).AND.(NHATSS(ITEMP).NE.14)) GOTO 140
      IF((NHATSS(ITEMP).EQ.14).AND.(NHATSS(JTEMP).EQ.14)) GOTO 130
C
C     COMPARE LENGTH OF TIME SLOTS HAVE BEEN UNOCCUPIED.
C
      ISUB=ITEMP+IPR
      JSUB=JTEMP+IPR
      IF(NCLOCK(ISUB).LE.NCLOCK(JSUB))  GOTO 140
C           SLOT JTEMP IS BEFORE ITEMP. REPLACE
  130 LISTHS(I)=JTEMP
      LISTHS(J)=ITEMP
      ITEMP=LISTHS(I)
  140 CONTINUE
  150 CONTINUE
C           WRITE PRIORITY LIST OF HATCH SLOTS.
  180 WRITE(NTAPE,185)NLISHS,(LISTHS(I),I=1,NLISHS)
  185 FORMAT(1X,I3,44H  UNOCCUPIED HATCH SLOTS  ID NOS. IN ORDER ARE--/1
     .X,40I3)
      GO TO 220
C
C           DATA ERROR--ARRIVING SHIP HAS NO OPERABLE HATCH SLOTS.
C
  200 IF(IEVTYP.NE.14) GOTO 220
      WRITE(NTAPE,205)
  205 FORMAT(1X,50HARRIVING SHIP HAS NO OPERABLE HATCH SLOTS.  ERROR IN
     .DATA.  PRINT DEBUG INFO AND CONTINUE.)
      CALL WCLOCK
  220 RETURN
      END
```

```
      SUBROUTINE LDACES(LCATE)
C
C              LOAD ACCESS. ROUTINE--LOADS CARGO FROM ONE ACCESS. LEVEL
C              ON A GENERAL CARGO SHIP TO A CRAFT. CALLED BY GENERAL
C              CARGO SHIP LOADING ROUTINE.
C
C*****
C
       COMMON/A01/IFLOCK(100),NEVTYP(100),NOPEL(100),NELEMT(6),NCODE(20),
     .            NCLPEL,NLSTEL,NTIME,IEVTYP,IELEMT,IACTEL,INTCUM,INTPER,
     .LPTIME,LOTIME,NPRINT,NTAPE,NCARD,NTAPE1,NTAPE2,ICOUT,NTAPE3
C
       COMMON/A02/CARGWT(40),CARGVL(40),CARGCT(40),NCARHL(40),NCGTAG(40)
C
       COMMON/A03/CRAFWT(10),CRAFVL(10),CRAFSP(10,4),CRAFHT(10),NCRAFM(10
     .),MULHAT(10),NCCITM(10,40),NFILE(10),CRAFFS(10)
C
       COMMON/A05/NESSHP( 5),NCHSHP( 5),IDSHIP( 5),NSHPHS(20),IDHSLT(20),
     .NCHCOR(20),LOCHS(20),NHATSS(20),NSTYP(20),NHATNO(20),IDCARH(20),NS
     .ROOM(20),NSTIME(20),NHATIX(100),NDCP(100),NACCES(100),NTOTAL(100),
     .NHTTAB(100,40),NSSSI(5),
     .            ICHCOR,LINDEX
C
       COMMON/A06/NCRTYP(10),NTKTYP(10),NLSTYP(15),NMHTYP(15,3),IDCRAF(30
     .),IDTRUK(30),IDLUS(30),IDSDVH(20),
     .            NCARTP,NCKFTP,NTRKTP,NLLSTP,NMHETP,NHTSTP,NCARHT,NMHEPL
     .,NLUS,NSI,NTAGTP
C
       COMMON/A07/DIST( 5),CAPST(3),ACAPST(3),LUSCRF(30),LUSTRK(30),LUSMH
     .E(30),LUSLOC(15),LUSSTI(15),LOCGTM(13,15,10),LOCTTM(13,15,10)
C
       COMMON/A08/LCRCAR(30,40),LTKCAR(30,40),LSTCAR(3,40)
C
       COMMON/A09/LISTCR(30),LISTHS(24),NSORT(30),NPRCAR(20),NPRCHC(10,10
     .,13),
     .            NLISCR,NLISHS,ISLOT,ICRAFT
C
       COMMON/A10/MCORTM(10,10),LOADTM(10,10,13),
     .NPDT,NOPCKF,NRTMF0,NRTM1F,NSMT,NSIMT,NHELOD,NSIWT
C
       COMMON/A11/NCITEM(40),NPLAT(20),
     .            ITIME,LCTIME,JSLOT,JHATCH,WEIGHT,VOLUME,L1,L3,CCWT,CCVL
     .            ,INDEX,NCONTR,CCFS,FLOOR
C
       COMMON/A13/NCRCUM(30,15),NTKCUM(30,9),MHECYC(15,3,2),MHECAR(15,3,
     .40),MHECUM(15,3, 4),LUSUSE(30,10),LUSCUM(30,2),NSTCUM(2,40),NHSCUM
     .(20,7),NHSCRF(20,10),NTRAFF(2),NCRCAR(30,40),INDCYC(30,2),KSTAT(30
     .,4,2),CSTAT(30,4,3)
C*****
       INTEGER*2NEVTYP,        NOPEL ,        NELEMT,        NCODE          A1
       INTEGER*2NCARHL,        NCGTAG                                       A2
       INTEGER*2NCRAFM,        MULHAT,        NCCITM,        NFILE          A3
       INTEGER*2NESSHP,        NCHSHP,        IDSHIP,        NSHPHS         A5
       INTEGER*2IDHSLT,        NCHCOR,        LOCHS ,        NHATSS         A5
       INTEGER*2NSTYP ,        NHATNO,        IDCARH,        NSROOM         A5
       INTEGER*2NSTIME,        NHATIX,        NDCP  ,        NACCES         A5
```



```
       INTEGER*2NTOTAL,        NHTTAB,        NSSSI                         A5
       INTEGER*2NCRTYP,        NTKTYP,        NLSTYP,        NMHTYP         A6
       INTEGER*2IDCRAF,        IDTRUK,        IDLUS ,        IDSDVH         A6
       INTEGER*2LUSCRF,        LUSTRK,        LUSMHE,        LUSLOC         A7
       INTEGER*2LUSSTI,        LOCGTM,        LOCTTM                        A7
       INTEGER*2LCRCAR,        LTKCAR,        LSTCAR                        A8
       INTEGER*2LISTCR,        LISTHS,        NSORT ,        NPRCAR         A9
       INTEGER*2NPRCHC                                                      A9
       INTEGER*2MCORTM,        LOADTM                                       A10
       INTEGER*2NCITEM,        NPLAT                                        A11
       ICRTYP=IDCRAF(ICRAFT)
       ISLTYP=IDHSLT(JSLOT)
       IF(IEVTYP.EQ.10)ICRTYP=1
C
C              IF MIX=0 , CARGO MIXES ARE NOT ALLOWED ON CRAFT.
C
       MIX=0
C
C              LOOP THRU CARGO MODULES.
C
       DO 500 I=1,NCARTP
       IF(NHTTAB(INDEX,I).EQ.0) GOTO 500
       ITACTP=NCGTAG(I)
C
C              FIND LOAD CATEGORY OF ITEM.
C
       IF(MIX.NE.0) GOTO 2000
       IF(((CARGCT(I).GT..1).OR.(CARGCT(I).LT.-1.1)) GOTO 1200
C              GENERAL CARGO
       ICATE=1
       GOTO 1300
C              VEHICLES
 1200  ICATE=3
C              TRY NEXT MODULE IF CATEGORIES ARE THE SAME.
 1300  IF((LCATE.NE.0).AND.(LCATE.NE.ICATE)) GOTO 500
C
C              CHECK FOR SD VEHICLES AT A CAUSEWAY
C
 2000  IF((IEVTYP.NE.10).OR.(CARGCT(I).LT..1)) GOTO 3
C
C              UNLOAD SD VEHICLES
C
       LTIME=NHTTAB(INDEX,I)*LOADTM(ISLTYP,ICRTYP,ITACTP)
       NLSTEL=NLSTEL+1
       NELEMT(5)=NELEMT(5)+1
       ISUB=NELEMT(5)
       IDSDVH(ISUB)=1
       NEVTYP(NLSTEL)=13
       DIS= 0.
       DO 1005 J=5,5
 1005  DIS=DIS+DIST(J)
       NCLOCK(NLSTEL)= ITIME+LCTIME+LTIME+(( 3600.*DIS)/CARGCT(I))
       NOPEL(NLSTEL)=NHTTAB(INDEX,I)
       NHTTAB(INDEX,I)=0
       NTOTAL(INDEX)=NTOTAL(INDEX)-NOPEL(NLSTEL)
       NTRAFF(2)=NTRAFF(2)+NOPEL(NLSTEL)
```

```
      OTIME=(ITIME+LDTIME+LTIME)/3600.
      OTIME1=NCLOCK(NLOTEL)/3600.
      WRITE(NTAPE,1010) OTIME,NOPEL(NLOTEL),I,OTIME1
 1010 FORMAT(1X,2HAT,F8.2,19H  HOURS A CONVOY OF,I4,17H  SE VEH. OF TYPE
     *,I3,31H  LEAVES FOR DEPOT TO ARRIVE AT,F8.2,6H  HOURS.)
      GOTO 70
C
C              FIND NUMBER OF ITEMS OF THIS MODULE THAT WILL FIT.
C
    3 IF(N(ITEM(I)).EQ.0)  GOTO 500
      NUMBER=NHTTAB(INDEX,I)
C              FIND NUMBER ALLOWED BY WT.
      ITEMP=(WEIGHT-CCWT)/CARGWT(I)
C              FIND NUMBER ALLOWED BY VOLUME.
      JTEMP=9999
      KTEMP=9999
      LTEMP=9999
      CVOL=CARCVL(I)
      CFLR=0
      IF(IEVTYP.EQ.10) GOTO 333
C              IS ITEM A VEHICLE?
      IF((CARGCT(I).GT.0.1).OR.(CARGCT(I).LT.-1.9)) GOTO 444
      GOTO 333
  444 LTEMP=(FLOOR-CCFS)/CVOL
      CFLR=CVOL
      CVOL=CVOL*(RAFHT(ICRTYP)
  333 JTEMP=(VOLUME-CCVL)/CVOL
C
C     FIND NUMBER OF ITEMS ALLLOWED.
C
    4 IF(N(ITEM(I)).GT.0) GO TO 5
      KTEMP=JTEMP
      GO TO 30
    5 L2=1
      NITEMS=0
      DO 15 J= 1,L2
      IF(IEVTYP.NE.10) GO TO 10
      NITEMS=NITEMS+LTKCAR(ICRAFT,J)
      GO TO 15
   10 NITEMS=NITEMS+LCRCAR(ICRAFT,J)
   15 CONTINUE
      KTEMP=N(ITEM(I))-NITEMS
   30 NUMBER=MIN0(NUMBER,ITEMP,JTEMP,KTEMP,LTEMP)
      IF(NUMBER.LE.0) GO TO 500
C
C              NUMBER OF ITEMS OF THIS MODULE THAT CAN BE LOADED IS KNOWN
C
C              UPDATE CARGO LOCATIONS.
      IF(LCATE.EQ.0) LCATE=ICATE
      CCWT=CCWT+CARGWT(I)*NUMBER
      CCVL=CCVL+CVOL*NUMBER
      CCFS=CCFS+CFLR*NUMBER
      NCONTR=NCONTR+NUMBER
      NHTTAB(INDEX,I)=NHTTAB(INDEX,I)-NUMBER
      NTOTAL(INDEX)=NTOTAL(INDEX)-NUMBER
      IF(IEVTYP.NE.10) GO TO 40
```



```
      LTKCAR(ICRAFT,I)=LTKCAR(ICRAFT,I)+NUMBER
      GO TO 45
   40 LCRCAR(ICRAFT,I)=LCRCAR(ICRAFT,I)+NUMBER
C              FIND TIME TO LOAD THESE ITEMS.
   45 LTIME=NUMBER*LOADTM(ISLTYP,ICRTYP,ITAGTE)
C              DOES "180 RULE" APPLY?
      IF((LOCHS(JSLOT).EQ.0).OR.(LOCHS(JSLOT).GE.5)) GO TO 70
      L2=NELEMT(5)
      DO 50 J=1,L2
      IF(NCHOR(J).NE.JHATCH) GO TO 50
      IF(J.EQ.JSLOT) GO TO 50
      IF(NHATSS(J).NE.10) GO TO 70
      ITEMP=NHATNO(J)
      GO TO 60
   50 CONTINUE
      GOTO 70
C
C              HAS CRAFT AT OPPOSITE HATCH ALREADY DEPARTED?
C
   60 IF((ITIME+LDTIME).GE.NCLOCK(ITEMP)) GO TO 70
C              "180 RULE" APPLIES
      OTIME=(LDTIME+ITIME)/3600.
      WRITE(NTAPE,65)OTIME
   65 FORMAT(1X,21H180 RULE APPLIED AT,F10.2,6H  HOURS.)
      LTIME=LTIME/.8+.5
   70 LDTIME=LDTIME+LTIME
  500 CONTINUE
      RETURN
      END
```

```
      SUBROUTINE LDCONS
C
C           CONTAINER SHIP LOADING ROUTINE--LOADS CARGO FROM CONTAINER
C           SHIP TO A CRAFT.
C
C*****
C
      COMMON/A01/ICLOCK(100),NEVTYP(100),NOPEL(100),NELEMT(6),NCODE(20),
     .            NCLKEL,NLSTEL,MTIME,IEVTYP,IELEMT,IACTEL,INTCUM,INTPER,
     .LPTIME,LSTIME,NPRINT,NTAPE,NCARD,NTAPE1,NTAPE2,ICOUT,NTAPE3
C
      COMMON/A02/CARGWT(40),CARGVL(40),CARGCT(40),NCARHL(40),NCGTAG(40)
C
      COMMON/A03/CRAFWT(10),CRAFVL(10),CRAFSP(10,4),CRAFHT(10),NCRAFM(10
     .),MULHAT(10),NCCITM(10,40),NFILE(10),CRAFFS(10)
C
      COMMON/A05/NESSHP( 5),NCHSHP( 5),IDSHIP( 5),NSHPHS(20),IDHSLT(20),
     .NCHCOR(20),LOCHS(20),NHATSS(20),NSTYP(20),NHATNO(20),IDCARH(20),NS
     .HOOM(20),NSTIND(20),NHATIX(100),NDCH(100),NACCES(100),NTOTAL(100),
     .NHTTAB(100,40),NSSSI(5),
     .           ICHCOR,LINDEX
C
      COMMON/A06/NCRTYP(10),NTKTYP(10),NLSTYP(15),NMHTYP(15,3),IDCRAF(30
     .),ITTRUK(30),IDLUS(30),IDSDVH(20),
     .           NCARTF,NCRFTP,NTRKTP,NLUSTP,NMHETP,NHTSTP,NCARHT,NMHEPL
     .,NLUS,NSI,NTAGTP
C
      COMMON/A07/DIST( 9),CAPST(3),ACAPST(3),LUSCRE(30),LUSTRK(30),LUSMH
     .E(30),LUSLOC(15),LUSSTT(15),LDCGTM(13,15,10),LDCTTM(13,15,10)
C
      COMMON/A08/LCRCAR(30,40),LTKCAR(30,40),LSTCAR(3,40)
C
      COMMON/A09/LISTCR(30),LISTHS(24),NSORT(30),NPRCAR(20),NPRCHC(10,10
     .,15),
     .           NLISCR,NLISHS,ISLOT,ICRAFT
C
      COMMON/A10/MOORTM(10,10),LOADTM(10,10,15),
     .NODI,NDECKC,NRTM60,NRTM15,NSMT,NSIMT,NHELOD,NSIWT
C
      COMMON/A11/NCITEM(40),NPLAT(20),
     .           ITIME,LDTIME,JSLOT,JHATCH,WEIGHT,VOLUME,L1,L3,CCWT,CCVL
     .           ,INDEX,NCONTR,CCFS,FLOOR
C*****
      INTEGER*2NEVTYP,      NOPEL ,      NELEMT,      NCODE        A1
      INTEGER*2NCARHL,      NCGTAG                                 A2
      INTEGER*2NCRAFM,      MULHAT,      NCCITM,      NFILE        A3
      INTEGER*2NESSHP,      NCHSHP,      IDSHIP,      NSHPHS       A5
      INTEGER*2IDHSLT,      NCHCOR,      LOCHS ,      NHATSS       A5
      INTEGER*2NSTYP ,      NHATNO,      IDCARH,      NSHOOM       A5
      INTEGER*2NSTIND,      NHATIX,      NDCH  ,      NACCES       A5
      INTEGER*2NTOTAL,      NHTTAB,      NSSSI                     A5
      INTEGER*2NCRTYP,      NTKTYP,      NLSTYP,      NMHTYP       A6
      INTEGER*2IDCRAF,      ITTRUK,      IDLUS ,      IDSDVH       A6
      INTEGER*2LUSCRE,      LUSTRK,      LUSMHE,      LUSLOC       A7
      INTEGER*2LUSSTT,      LDCGTM,      LDCTTM                    A7
      INTEGER*2LCRCAR,      LTKCAR,      LSTCAR                    A8
```



```
      INTEGER*2LISTCR,      LISTHS,      NSORT ,      NPRCAR       A9
      INTEGER*2NPRCHC                                              A9
      INTEGER*2MOORTM,      LOADTM                                 A10
      INTEGER*2NCITEM,      NPLAT                                  A11
      ISLTYP=IDHSLT(JSLOT)
      ICRTYP=IDCRAF(ICRAFT)
      IF(IEVTYP.EQ.10)ICRTYP=1
      IPLAT=0
      IMAX=0
      DO 310 K=1,NCARTP
      ITEMP=NCITEM(K)
  310 IMAX=MAX0(ITEMP,IMAX)
C
C           LOOP THRU INDEX NUMBERS FOR THIS CARGO HATCH.
C
      DO 200 I=L1,L3
C
C           HELICOPTER AT SS SHIP.
C
      IF((IDCARH(JHATCH).EQ.2).AND.(NCRAFM(ICRTYP).EQ.6)) GOTO 20
C           IS CELL EMPTY?
      IF(NTOTAL(I).NE.0) GO TO 20
    5 WRITE(NTAPE,10) NDCH(I)
   10 FORMAT(1X,4HCELL,I4,11H  IS EMPTY.)
      GO TO 200
C
C           CELL IS NOT EMPTY. FIND HIGHEST FILLED LEVEL.
C
   20 DO 150 J=1,NCARTP
C
C           FOR HELICOPTERS AT SS SHIP, IS CONTAINER SNATCHABLE?
C
      ISTYP=IDCARH(JHATCH)
      IF((NCRAFM(ICRTYP).EQ.6).AND.(ISTYP.EQ.5).AND.(J.GT.NSHOOM(JHATCH)
     .).AND.(LOCHS(JSLOT).EQ.8)) GOTO 200
      IF((NCRAFM(ICRTYP).NE.6).OR.(ISTYP.NE.2)) GOTO 21
      ICARTP=NPLAT(JSLOT)
      IPLAT=1
      GOTO 22
C           IS A CONTAINER AT THIS LEVEL?
   21 IF(NHTTAB(I,J).EQ.0) GO TO 150
C
C           CAN THIS CONTAINER BE LOADED?
      ICARTP=NHTTAB(I,J)
C     CHECK NUMBER OF CONTAINERS
   22 IF((NCITEM(ICARTP).GT.-1  ).AND.(IMAX.LT.(NCONTR+1)))
     .GOTO 220
C           CHECK WEIGHT
      IF(WEIGHT.LT.(CCWT+CARGWT(ICARTP))) GO TO 150
C           CHECK VOLUME
      IF(VOLUME.LT.(CCVL+CARGVL(ICARTP))) GO TO 150
C
C           CARGO ITEM CAN BE LOADED.
C
      CCWT=CCWT+CARGWT(ICARTP)
      CCVL=CCVL+CARGVL(ICARTP)
```

```
      NCONTR=NCONTR+1
C
C          CALL FWAY?
C
      IF(IEVTYP.NE.10) GO TO 140
      LTKCAP(ICRAFT,ICARTP)=LTKCAP(ICRAFT,ICARTP)+1
      GO TO 145
  140 LCRCAP(ICRAFT,ICARTP)=LCRCAP(ICRAFT,ICARTP)+1
C
C          FOR HELICOPTER PLATFORM, SET PLATFORM EMPTY.
C
      IF(IPLAT.EQ.1) GOTO 146
  145 NTOTAL(I)=NTOTAL(I)-1
      NHITAR(I,J)=0
  146 ITAGTP=NCGTAG(ICARTP)
      FACTOR=1.
      IF((J.GT.NSHORM(JHATCH)).AND.(LOCHS(JSLOT).EQ.9))  FACTOR=1.43
      LDTIME=LDTIME+LOADTM(ISLTYP,ICRTYP,ITAGTP)*FACTOR
C
C          LOAD ONE CONTAINER ONLY?
C
      IF(IPLAT.EQ.1) GOTO 300
      IF(NTOTAL(I).EQ.0) WRITE(NTAPE,13) NDCP(I)
      IF((IEVTYP.EQ.10).OR.(NCRAFP(ICRTYP).EQ.6)) GOTO 202
  150 CONTINUE
      GO TO 210
  190 CONTINUE
  200 CONTINUE
      GO TO 250
C
C          DETERMINE HIGHEST PRIORITY FOR ALL RELEVANT SLOTS.
C          LOOP THROUGH CELLS
  202 IFLAG=0
      IF(IEVTYP.NE.10) NPLAT(JSLOT)=0
      DO 218 I=L1,L3
      IF(NTOTAL(I).EQ.0) GOTO 218
      DO 212 J=1,NCARTP
      IF(NHITAR(I,J).EQ.0) GOTO 212
      IF(IFLAG.NE.0) GOTO 205
      IFLAG=1
      IF(IEVTYP.EQ.10) GOTO 300
C          FIND NPLAT FOR NSS HELICOPTER SLOT.  CHECK LEVEL AND WT.
  205 IF((J.GT.NSHORM(JHATCH)).AND.(LOCHS(JSLOT).EQ.8) ) GOTO 218
C          FIND MAX WT.
      WTMAX=0.
C
      DO 206 K=1,NCRFTP
      IF(NCRAFP(K).NE.6) GOTO 206
      IF(CRAFWT(K).GT.WTMAX) WTMAX=CRAFWT(K)
  206 CONTINUE
      ISUB=NHITAR(I,J)
      IF(WTMAX.LT.CARGWT(ISUB)) GOTO 218
      NPLAT(JSLOT)=ISUB
      GOTO 300
  212 CONTINUE
  218 CONTINUE
```



```
  220 WRITE(NTAPE,230)
  230 FORMAT(1X,14HCRAFT IS FULL.)
  250 IF(IEVTYP.EQ.10) GO TO 350
C
C          ADD REQUIRED NUMBER OF EMPTY CONTAINERS FOR RETROGRADE.
C
      LCRCAP(ICRAFT,ICARTP+1)=NCONTR
C
C          DETERMINE HIGHEST PRIORITY CARGO IN HATCH.
C
  300 NPRCAR(JHATCH)=0
      DO 258 I=L1,L3
      IF(NTOTAL(I).EQ.0) GOTO 258
      DO 256 J=1,NCARTP
      IF(NHITAR(I,J).EQ.0) GOTO 256
      NPRCAR(JHATCH)=NHITAR(I,J)
      GOTO 1000
  256 CONTINUE
  258 CONTINUE
C
C          CARGO HATCH IS EMPTY.
C
      L2=NELEMT(4)
      DO 260 I=1,L2
      IF((NCHCAR(I).EQ.JHATCH).AND.(I.NE.JSLOT)) GO TO 270
  260 CONTINUE
      GOTO 1000
  270 NHATSS(I)=3
      WRITE(NTAPE,280)I,NHATSS(I)
  280 FORMAT(1X,24HCARGO HATCH WILL BE EMPTY, SO SLOT,I4,10H HAS STATUS
     .RESET TO,I4)
      CALL HSSORT
 1000 RETURN
      END
```

```
      SUBROUTINE LDGC5
C
C          GENERAL CARGO SHIP LOADING ROUTINE--LOADS CARGO FROM A
C          GENERAL CARGO SHIP TO A CRAFT.
C
C*****
C
      COMMON/A01/NCLOCK(100),NEVTYP(100),NOFEL(100),NELEMT(6),NCOPE(23),
     .           NCLKEL,NLSTEL,NTIME,IEVTYP,IELEMT,IACTEL,INTCUM,INTPER,
     .LPTIME,LSTIME,NPRINT,NTAPE,NCARD,NTAPE1,NTAPE2,ICOUT,NTAPE3
C
      COMMON/A02/CARGWT(40),CARGVL(40),CARGCT(40),NCARHL(40),NCSTAG(40)
C
      COMMON/A03/CRAFWT(10),CRAFVL(10),CRAFSP(10,4),CRAFHT(10),NCRAFM(10
     .),MULHAT(10),NCCITM(10,40),NFILE(10),CRAFFS(10)
C
      COMMON/A04/TRUKWT(10),TRUKVL(10),TRUKSP(10,2),NTCITM(10,40),NPRTRK
     .(10,10),SPATCS(30),MHEPRY(10,10,13),MHETRK(20),LUGTTM(13,15,10),LD
     .TTIM(13,15,10),
     .          NRSCAR,IPRTRK,ITRUCK,NTRUKO,NTRKPR
C
      COMMON/A05/VESSHP( 5),NCHSHP( 5),IDSHIP( 5),NSHPHS(20),IDHSLT(20),
     .NCHCLS(20),LOCES(20),NHATSS(20),NSTYP(20),NHATNG(20),IDCARH(20),NS
     .HOM(20),NSTING(20),NHATIX(100),NDCH(100),NACCES(100),NTOTAL(100),
     .NHTTAB(100,40),ESSI(5),
     .          ICHCUK,LINDEX
C
      COMMON/A06/NCRTYP(10),NTKTYP(10),NLSTYP(15),NMHTYP(15,3),IDCRAF(30
     .),ITTRUK(30),ICLUS(30),IPSDVH(20),
     .          NCARTF,NCRFTP,NTRKTP,NLUSTP,NMHETF,NHTSTP,NCARHT,NMHEFL
     .,NLUS,NSL,NTAGTP
C
      COMMON/A07/DIST( 9),CAPST(3),ACAPST(3),LUSCRF(30),LUSTRK(30),LUSMH
     .E(15),LUSLC(15),LUSSTT(15),LDCCTM(13,15,10),LDCTTM(13,15,10)
C
      COMMON/A08/LCRCAR(30,40),LTKCAR(30,40),LSTCAR(3,40)
C
      COMMON/A09/LISTCR(30),LISTHS(24),NSORT(30),NERCAR(20),NPRCHC(10,10
     .,13),
     .          NLISCR,NLISHS,ISLOT,ICRAFT
C
      COMMON/A10/MFORTM(10,10),LOADTM(10,10,13),
     .NFT,IDECKF,ARTMFU,AFTMIS,NSMT,NSIMT,NHELOD,NSIVT
C
      COMMON/A11/,CITEM(40),NPLAT(20),
     .          ITIME,LDTIME,JSLOT,JHATCH,WEIGHT,VOLUME,L1,L3,CCWT,CCVL
     .          ,INDEX,NCONTR,CCFS,FLOOR
C
      COMMON/A12/LUSCUF(30),NPRCCF(30),NPPLUS(15,10,13),NPRMHE(15,10,13)
     .,LUSLIS(16),LUSHTM(10,15),LUSSOT(10,15),
     .          LUSCRC,NLUSPR,LUSCPN
C
      COMMON/A13/CRCUM(30,15),NTKCUM(30,9),MHECYC(15,3,2),MHECAR(15,3,
     .40),MHECUM(15,3, 4),LUSUSF(30,10),LUSCUM(30,2),NSTCUM(2,40),NHSCUM
     .(20,2),PESCHF(20,10),NTRAFF(5),MCRCAR(30,40),INDCYC(30,2),KSTAT(30
     .,4,2),CSTAT(30,4,3)
C*****
      INTEGER*2NOFTYF,       NOFEL ,       NELEMT,       NCOPE        A1
      INTEGER*2NCARHL,       NCSTAG                                   A2
      INTEGER*2NCRAFM,       MULHAT,       NCCITM,       NFILE        A3
      INTEGER*2NTCITM,       NPRTRK,       NRSTCG,       MHEPRY       A4
      INTEGER*2MHETRK,       LUGTTM,       LDTGTM                     A4
      INTEGER*2VESSHP,       NCHSHP,       IDSHIP,       NSHPHS       A5
      INTEGER*2IDHSLT,       NCHCLS,       LOCHS ,       NHATSS       A5
      INTEGER*2NSTYP ,       NHATNG,       IDCARH,       NSHOM        A5
      INTEGER*2NSTING,       NHATIX,       NDCH  ,       NACCES       A5
      INTEGER*2NTOTAL,       NHTTAB,       NSSSI                      A5
      INTEGER*2NCRTYP,       NTKTYP,       NLSTYP,       NMHTYP       A6
      INTEGER*2IDCRAF,       ITTRUK,       ICLUS ,       IPSDVH       A6
      INTEGER*2LUSCRF,       LUSTRK,       LUSMHE,       LUSLC        A7
      INTEGER*2LUSSTT,       LDCCTM,       LDCTTM                     A7
      INTEGER*2LCRCAR,       LTKCAR,       LSTCAR                     A8
      INTEGER*2LISTCR,       LISTHS,       NSORT ,       NERCAR       A9
      INTEGER*2NPRCHC                                                 A9
      INTEGER*2MFORTM,       LOADTM                                   A1
      INTEGER*2NCITEM,       NPLAT                                    A11
      INTEGER*2LUSCUF,       NPRCCF,       NPPLUS,       NPRMHE       A12
      INTEGER*2LUSLIS,       LUSHTM,       LUSSOT                     A12
      IFLAG=0
      IDECK=NDCH(L1)
      IACCES=NACCES(L1)
      IRFLAC=IACCES
      LCATF=0
C
C          LOOP THRU INDEX NUMBERS IN HATCH TABLE.
C
      DO 500 INDEX=L1,L3
C          NEW DECK?
      IF(NDCH(INDEX).EQ.IDECK) GO TO 90
C
C          NEW DECK, IS OLD DECK EMPTY?
C
      IF(IRFLAC.LE.IACCES) GO TO 600
C
C          OLD DECK IS EMPTY. START ON NEXT DECK, BUT CHECK FOR
C          TYPES FIRST.
C
C          BOTTOM FROM BIGGER?
      IDECK=IDECK+1
      ICLKEL=NCLKEL+NELEMT(3)+JSLOT
      IF(NOPEL(ICLKEL).NE.90) GOTO 4
C
C          BOTTOM ROOM IS BIGGER. DOES NEW DECK NEED IT.
C
      DO 2000 J=1,NCARTF
      IF(NHTTAB(INDEX,J).GT.0) GOTO 2010
 2000 CONTINUE
      WRITE(NPRINT,2005) IDECK
 2005 FORMAT(1X,17HLOGIC ERROR--DECK,I4,7H EMPTY)
      CALL WOECK
      GOTO 500
 2010 IF(NCARHL(J).NE.1) GOTO 6
```

```
C            NO BOOMS RERIGGED.  OPEN DECK.
    4 IDNSHIPS(I,L,T)
      IF(IPSHIP(I).EQ.1) LDTIME=LDTIME+NOPENT
      UTIME=(LDTIME+ITIME)/3600.
      WRITE(NTAPE,5)IDECK,UTIME
    5 FORMAT(1X,4HDECK,I4,11H  OPENED AT,F10.2,6H  HOURS.)
      GO TO 80
C            FIRST BOOM TO HATCH SHARING IT?
C
    6 IPRHAT=NSHOOM(HATCH)
      ICARTF=IPRCAR(IPRHAT)
      IF(NCARHL(ICARTF).NE.1)GO TO 30
C
C       FIRST BOOM,FIND HATCH SLOTS.
C
      L2=NELEMT(4)
      DO 10 I=1,L2
      IF(NCHCOR(I).EQ.IPRHAT)GO TO 20
   10 CONTINUE
      WRITE(NPRINT,15) IPRHAT
   15 FORMAT(1X,11HCARGO HATCH,I4,21H  HAS NO HATCH SLOTS.)
      CALL NCLOCK
      STOP
C
C       HATCH SLOT FOR RERIGGING IS FOUND.
C
   20 JCLKEL=NCLKEL+NELEMT(5)+I
      NCLOCK(JCLKEL)=ITIME+LDTIME+NRTMFO
      ISUB=NCLKEL+NSHEPS(I)
      NHSCUM(I,1)=NHSCUM(I,1)+NCLOCK(JCLKEL)+NCLOCK(ISUB)
      NEVTYP(JCLKEL)=15
      NOPEL(JCLKEL)=FO
      IFLAG=1
C
C            HATCH SLOT ON OPPOSITE SIDE OF SHIP CAN BE OPENED.
C
   30 L2=NELEMT(4)
      DO 40 I=1,L2
      IF((I.NE.JSLOT).AND.(NCHCOR(I).EQ.HATCH)) GO TO 50
   40 CONTINUE
      GO TO 60
C
C            SET FUTURE EVENT TO OPEN OPPOSITE HATCH SLOT
C
   50 JCLKEL=NCLKEL+NELEMT(5)+I
      NCLOCK(JCLKEL)=ITIME+LDTIME+NRTM15
      ISUB=NCLKEL+NSEPES(I)
      NHSCUM(I,1)=NHSCUM(I,1)+NCLOCK(JCLKEL)+NCLOCK(ISUB)
      NEVTYP(JCLKEL)=15
      NOPEL(JCLKEL)=15
      IFLAG=1
C
C            THIS IS TOP ROOM AT CURRENT SLOT.
C
   60 LDTIME=LDTIME+NRTM15
      NEVTYP(ICLKEL)=0
```



```
      NOPEL(ICLKEL)=15
      NHSCUM(JSLOT,1)=NHSCUM(JSLOT,1)+ITIM15
      TIME=(LDTIME+ITIME)/3600.
      WRITE(NTAPE,65)NOPEL(ICLKEL),UTIME
   65 FORMAT(1X,19HDELAY---BOOM TYPE,I4,11H  RIGGED AT,F8.2,6H  HOURS.)
C
C            SET NEW DECK AND RELATIVE ACCESS NUMBERS
C
   80 IDECK=NDECK(INDEX)
      IRFLAG=JACCES(INDEX)
C            SET NEW ACCESS NUMBER.
   90 IACCES=IACCES(INDEX)
C            IS NEW ACCESS ACCESSIBLE FOR UNLOADING?
      IF((IACCES-IRFLAG).GT.1) GO TO 560
C     LOADING OF THIS ACCESS, CAN PROCEED.
C
      CALL LOACES(LOCATE)
C            IS ACCESS EMPTY?
      IF(NTOTAL(INDEX).NE.0) GO TO 98
      IF(IACCES.EQ.IRFLAG)IRFLAG=IACCES+1
      GO TO 560
C
C            CAUSEWAY WITH SO VEHICLES?
C
   98 IF((IEVTYP.EQ.10).AND.(ICRAFT.EQ.0)) GOTO 500
C
C            IS CRAFT FULL?
C            CHECK IF 1 PALLET WILL FIT.
C
C            CHECK WEIGHT.
  100 IF(NCITEM(NCARTP).LE.0) GOTO 500
      IF(WEIGHT.LT.(CCWT+CARGWT(NCARTP))) GO TO 580
C            CHECK VOLUME.
      IF(VOLUME.LT.(CCVL+CARGVL(NCARTP)))GO TO 580
C            CHECK NUMBER OF ITEMS
      NUMBER=0
      DO 125 I=1,NCARTF
      IF(IEVTYP.NE.10) GO TO 120
      NUMBER=NUMBER+LIKCAR(ICRAFT,I)
      GO TO 125
  125 CONTINUE
  120 NUMBER=NUMBER+LCRCAS(ICRAFT,I)
      IF(NCITEM(NCARTP).LT.(NUMBER+1)) GO TO 580
C            CRAFT IS NOT FULL. CONTINUE LOADING.
  500 CONTINUE
C
C            END OF LOADING OPERATION.
C
      WRITE(NTAPE,510)
  510 FORMAT(1X,26HALL CARGO TRIED OR LOADED.)
      GO TO 610
C
C            CRAFT IS FULL.
C
  580 WRITE(NTAPE,585)
  585 FORMAT(1X,14HCRAFT IS FULL.)
```

```
      T  81
C
C     REMAINING CARGO NOT ACCESSIBLE.
C
590 WRITE(NTAPE,595)
595 FORMAT(1X,?REMAINING CARGO INACCESSIBLE.)
      GO TO 81
C
C              NO. DECK CANNOT BE OPENED.
C
600 WRITE(NTAPE,605)
605 FORMAT(1X,?CORNER DECK CANNOT BE OPENED.)
C
C              FIND HIGHEST PRIORITY CARGO TYPE LEFT.
C
610 NPRCAR(JHATCH)=
      DO 6   INDEX=L1,L5
      IF(TOTAL(INDEX).NE.0) GO TO 600
620 CONTINUE
C
C              CARGO HATCH IS EMPTY.
C              OPPOSITE HATCH SLOT SHOULD BE CLOSED.
C
      L  NELEMT(4)
      DO 6   I=1,L
      IF((I.NE.JSL(I)).AND.(NCHCOR(I).EQ.JHATCH)) GO TO 640
6    CONTINUE
      GO TO 6
C              OPPOSITE HATCH SLOT IS EMPTY.
640 L2=  T (I)
      GO T  (740,645,740,650,660,660,670,690,740,780,680,740),L2
C              CLOSED SLOT TO EMPTY.
645 HATS(I)=
      GO T  78
C              SET SLOT TO "EMPTY"
650 HATS(I)=
      CALL  SSORT
      GO  78
C              SET SLOT TO "EMPTY, BLOCKED"
660 HATS(I)=
      TO 78
C              SLOT IS SAVED, UNSAVE CRAFT.
670 HATS(I)=
      SLT    H  =  +1
      LISTR(NLISC(I))=HATS(I)
      SHSTN(I)=
      GO TO 78
C              SLOT IS SAVED FOR BLOCKING.
680 HATS(I)=1
      GO TO 78
C
C              ERROR ROUTINE--IMPOSSIBLE COMBINATION OF HATCH SLOT STATES.
C
740 WRITE(NPRINT,745)I,HATS(I)
745 FORMAT(1X,4HSLOT,I4,12H  WITH STATE,I4,2?H  IS NOW EMPTY.  ERROR.)
      CALL  JCLOCK
```



```
      STOP
C              OPPOSITE SLOT HAS UPDATED STATE.
780 WRITE(NTAPE,785)I,HATS(I)
785 FORMAT(1X,24HCARGO HATCH WILL BE EMPTY, SO SLOT,I4,??H HAS STATE R
     .ESET TO ,I4)
      GO TO 830
C
C              SET NEW PRIORITY CARGO TYPE
C
800 DO 805 I=1,NCARD
      IF(NHITAB(INDEX,I).NE.0) GO TO 810
805 CONTINUE
810 NPRCAR(JHATCH)=I
830 IF(IFLAG.EQ.1)  CALL MINCIK
      RETURN
      END
```

```
      [illegible]                 DATE [illegible]              [illegible]

      SUBROUTINE [illegible]
C
C         [illegible] ROUTINE --NOT USED.  CHECK FOR ERROR.
C
C
      COMMON/A01/[illegible],NEVTYP(100),[illegible],NELEMT(6),[illegible],
     .      [illegible],[illegible]TEL,MTI[illegible],IEVTYP,IELEMT,IACTEL,INTCUM,I[illegible],
     .LETIME,L[illegible],NPRINT,NTAPE,NCARD,NTAPE1,NTAPE2,IOUT,NTAPE3
C*****
      [illegible] NEVTY ,        [illegible] ,        NELEMT,        NCODE        A1
      [illegible](NPRINT,1[illegible])
    1 [illegible] ---STARTING LOADING ATTEMPTED FOR LASH.)
      [illegible]
      [illegible]

      [illegible]                 DATE [illegible]              [illegible]

      SUBROUTINE [illegible]
C
C         [illegible] EXECUTIVE ROUTINE SUPERVISOR ROUTINE FOR [illegible]
C         LOADING OF CRAFT. DETERMINE TRAVEL TIME FROM [illegible],
C         [illegible] AND [illegible] TIMES. TRANSFERS TO THE APPROPRIATE
C         [illegible] ROUTINE BASED ON SHIP TYPE.
C
C*****
C
      COMMON/A01/[illegible](100),NEVTYP(100),[illegible](100),NELEMT(6),NCODE(20),
     .      [illegible],[illegible]TEL,MTI[illegible],IEVTYP,IELEMT,IACTEL,INTCUM,I[illegible],
     .LETIME,L[illegible]TIME,NPRINT,NTAPE,NCARD,NTAPE1,NTAPE2,IOUT,NTAPE3
C
      COMMON/A02/CARWT(40),CARVL(40),CART[illegible](40),NCARPL(40),N[illegible](40)
C
      COMMON/A03/CRAFWT(10),CRAFVL(10),CRAFSP(10,5),CRAFHT(10),[illegible](10
     .),MOLHAT(10),NCCTIM(10,4),[illegible](10),CRA[illegible](10)
C
      COMMON/A04/TRUKWT(10),TRUKVL(10),TRUKSP(10,2),[illegible](10,4),[illegible]
     .(10,1[illegible]),[illegible](40),MPE[illegible]Y(10,10,15),[illegible](20),[illegible](15,15,10),I[illegible]
     .T[illegible](15,15,10),
     .          [illegible]CAR,IERTRK,I[illegible],MTRUK[illegible],NT[illegible]
C
      COMMON/A05/[illegible]( 5),NCRSH[illegible]( 5),ISSHIP( 5),[illegible]( ),I[illegible](20),
     .NCHC [illegible](20),[illegible]S(20),[illegible]HATS(20),[illegible]STY[illegible](20),[illegible]( ),I[illegible](20),[illegible]
     .BOD[illegible](20),N[illegible](20),[illegible]HATIX(1 0),N[illegible](100),[illegible](100),[illegible]TAL(100),
     .[illegible]TAP(100,40),[illegible]SSI(5),
     .          ICHC[illegible],LINDEX
      COMMON/A06/NCRTYP(10),NTRTYP(10),NESTYP(10),[illegible]TYP(10,5),I[illegible](5
     .),I[illegible]TRUK(30),IELUS(35),I[illegible](20),
     .          NCARTF,NC[illegible]TP,NTS[illegible]TF,NLUSTP,N[illegible]TF,N[illegible],NCA[illegible],[illegible]
     ..NLU[illegible],NSI,[illegible]TACTP
C
      COMMON/A07/DIST( 9),CAP[illegible](5),ACA[illegible](4),L[illegible](30),L[illegible](30),L[illegible]
     .(30),LUSL[illegible](15),LUSSTT(15),L[illegible](15,1[illegible],10),L[illegible](15,15,10)
C
      COMMON/A08/L[illegible]CAR(30,40),LTRCAR([illegible],40),L[illegible]TCAR(3,40)
C
      COMMON/A09/LISTCR(30),LISTHS(20),N[illegible](50),N[illegible](20),[illegible](1[illegible],1
     .,15),
     .          NLISC[illegible],NLISHS,I[illegible]T,ICRAFT
C
      COMMON/A10/M[illegible](10,10),L[illegible]TY(10,10,15),
     .[illegible]T,[illegible]CKS,[illegible]TIM[illegible],[illegible]T[illegible],[illegible]T,[illegible]INT,[illegible]LOF,[illegible]INT
C
      COMMON/A11/[illegible]ITEM(40),[illegible](10),
     .          ITIME,LOTIME,[illegible],JBATCH,WEIGHT,VOLUME,L1,L[illegible],[illegible],T,[illegible]
     .          ,L[illegible],N[illegible]CNTR,[illegible],[illegible]
C
      COMMON/A12/L[illegible](30),[illegible](30),N[illegible](15,1[illegible],1[illegible]),[illegible](1[illegible],10,1[illegible])
     .,LUSLIS(15),LUS[illegible](15,15),L[illegible]T(15,15),
     .          L[illegible],NLUSPK,L[illegible]
C
      COMMON/A13/[illegible](30,15),NT[illegible](30,9),M[illegible]CYC(1[illegible],[illegible]),M[illegible](1[illegible],3,
     .40),[illegible](1[illegible],7, 4),LUSUSE(5,10),LUSCUM(30,[illegible]),[illegible](5,40),[illegible]SCUM
     .(20,7),[illegible](20,10),NTRAFF(7),[illegible]CAR(30,40),I[illegible]CYC(30,2),[illegible]TAT(30
```

```
      ...4,3),C(TAT(...4,3)
C.....
      INTEGER*2 NEVTYP,      N PEL ,      NELEMT,      NCODE        A1
      INTEGER*2 NCRAFL,      NCGT25                                 A2
      INTEGER*2 ONCRAFT,     MULHAT,      NCCITM,      NFILE        A3
      INTEGER*2 NTCITM,      NPRIRK,      NCHTCG,      MHEPRY       A4
      INTEGER*2 MFEIRK,      LOCITM,      LDTCTM                    A4
      INTEGER*2 ONESCHF,     NCHSHP,      IDSHIP,      NSHPHS       A5
      INTEGER*2 RIDHSLT,     NCHCPR,      LOCHS ,      NHATSS       A5
      INTEGER*2 ONSTYP ,     NHATNC,      IDCARH,      NSHOOM       A5
      INTEGER*2 ONSTINE,     NHATIX,      NDCP ,       NACCES       A6
      INTEGER*2 MTOTAL,      NPTEAR,      NSSST                     A6
      INTEGER*2 ONCRTYP,     NTKTYP,      NLSTYP,      NPHTYP       A6
      INTEGER*2 TLCCAR,      IDTRUK,      IDLUS ,      IDSDVH       A6
      INTEGER*2 OLUCCHE,     LUSTRK,      LUSMHE,      LUSLOC       A7
      INTEGER*2 OLUSCTT,     LDCGTM,      LDCTTM                    A7
      INTEGER*2 OLCRCAR,     LTKCAR,      LSTCAR                    A8
      INTEGER*2 OLISTCE,     LISTHS,      NSORT ,      NPRCAR       A9
      INTEGER*2 ONERCHC                                             A9
      INTEGER*2 OMCDHTM,     LOADTM                                 A10
      INTEGER*2 OCITEM,      NPLAT                                  A11
      INTEGER*2 OLUSQUE,     NERCCC,      NPRLUS,      NPRMHE       A12
      INTEGER*2 OLUSSLT,     LUSBTM,      LUSSLT                    A12
      DIMENSION IOLT(3),INE(5),KSLOT(6)
C
      ICRTYP=IDCRAF(ICRAFT)
      LCTIM=0
      ITIME=MTIME
      IHATCH=NCHCPR(ISLOT)
      ISLTYP=IDHSLT(ISLOT)
      ISTYP=NSTYP(ISLTYP)
      ICNTR=0
      CCWT=
      CCVL=
      CCSS=0.
      ITRAV=
C
C           SET CYCLE START TIME INDICATOR.
C
      INECYC(ICRAFT,2)=MTIME
      DO 5 I=1,?
      ICT(I)=0
    5 IOUT(I)=0.
C
C           CRAFT ARR. AT SHIP*S QUEUE EVENT?
C
C           ADD TRAVEL TIME FROM SHIP*S QUEUE. CONVERT UNITS
      IF(IEVTYP.NE.1) GO TO 20
      ITRAV=      ((60.*FIST(2))/(1.1515*CRAFSP(ICRTYP,3)))+.5
      NCRCUM(ICRAFT,3)=NCRCUM(ICRAFT, 3)+ITRAV
      ITIME=ITIME+ITRAV
      GO TO 50
C
C           IS SHIP A LASH?
C
   20 IF(ISTYP.NE.?) GO TO 50
```

```
      ITIME=ITIME+NPRT
C
C           ADD MOORING TIME.
C
   50 ITIME=ITIME+MOORTM(ISLTYP,ICRTYP)
      NCRCUM(ICRAFT,4)=NCRCUM(ICRAFT,4)+MOORTM(ISLTYP,ICRTYP)
      OTIME=(ITIME)/60.
      OTIME1=(ITIME-MTIME)/60.
      WRITE(NTAPE,60)OTIME1,OTIME
   60 FORMAT(1X,'TRAVEL, APPROACH, AND MOORING TIME=',F6.2,5X,'LOADING
     * BEGINS AT',F10.2,' HOURS.')
C
C           WATER-CRAFT ARRIVING AT SHARED SLOT AT ?? CONTAINER SHIP?
C
      IF(ISTYP.NE.2) GOTO 92
      IF(LOCHS(ISLOT).NE.7) GOTO 92
      IF(NCHCPR(ISLOT).NE.NCHCPR(ISLOT+1)) GOTO ??
C
C           SAVE WATER-CRAFT LOAD START TIME.
C
      NPLAT(ISLOT)=ITIME
C           HELICOPTERS IN SYSTEM?
      DO 1090 I=1,NCRFTP
      IF((NCRTYP(I).GT.0).AND.(NCRAFM(I).EQ.?)) GOTO 1092
 1090 CONTINUE
      GOTO 92
C
C           GENERATE EVENT 19--CRAFT LEFT AT HATCH SLOT--FOR WATER-
C           CRAFT AT SHARED SLOT.
C
 1092 NCLOCK(ICRAFT)=ITIME
      NEVTYP(ICRAFT)=19
      NOPEL(ICRAFT)=ISLOT
      GOTO 1000
C
C           CHECK IF MULTI-HATCHED LOADING CAN OCCUR.
C
   92 IF(ISTYP.NE.1) GO TO 160
      NHATLD=MULHAT(ICRTYP)-10*(MULHAT(ICRTYP)/10)
      IF(NHATLD.EQ.1)GO TO 160
C
C           CRAFT CAN PERFORM MULTI-HATCH LOADING.
C           IS THERE A COMPATIBLE HATCH SLOT?
      ITEMP=1
      JTEMP=0
      KSLOT(1)=ISLOT
      LL2=NELEMT(4)
      DO 150 I=1,LL2
      IF(I.EQ.ISLOT) GOTO 150
      IF(NSHPHS(I).NE.NSHPHS(ISLOT)) GOTO 150
C
C           SLOT IS ON THE SAME SHIP.
C           IS IT BLOCKED AND UNOCCUPIED?
      IF((NHATSS(I).NE.0).OR.(NHATOC(I).NE.ISLOT)) GOTO 150
C           IS CRAFT COMPATIBLE WITH SLOT?
      JHATCH=NCHCPR(I)
```

```
      ICARTP=NHCAR(JHATCH)
      ITAGT=NCGTAG(ICARTP)
      JSLTYP=IQUSLT(I)
      IF(NFRC(C(ICRTYP,JSLTYP,ITAGTP).EQ.0) GOTO 160
      IF(NCCLTM(ICRTYP,ICARTP).EQ.0) GOTO 150
C
C           COMPATIBLE SLOT IS FOUND.
C
      ITEMP=ITEMP+1
      KSLOT(ITEMP)=I
      IF(ITEMP.GE.NHATLE) GOTO 175
  150 CONTINUE
      GOTO 175
C
C           MULTI-HATCH LOADING WILL NOT OCCUR
C
  160 ITEMP=1
      KSLOT(1)=ISLOT
C
C     CALL LOADING ROUTINE ONCE FOR EACH HATCH.
C
      JTEMP=0
  170 DO 180 J=1,ITEMP
      JSLOT=KSLOT(J)
C     RESET CAPACITIES OF CRAFT FOR EACH SLOT.
      WEIGHT = J*(CRAFWT(ICRTYP)/ITEMP)
      VOLUME = J*(CRAFVL(ICRTYP)/ITEMP)
      FLOOR=J*(CRAFFS(ICRTYP)/ITEMP)
      DO 175 I=1,NCARTF
      NCITEM(I)=J*NCCITM(ICRTYP,I)/ITEMP
      IF(NCCITM(ICRTYP,I).EQ.-1) NCITEM(I)=-1
  175 CONTINUE
      JHATCH=NCHCAT(JSLOT)
C
C           FIND FIRST + LAST INDEX NUMBERS FOR CARGO HATCH.
C
      L2=NSTIND(JHATCH)
      L1=0
      L3=LINDEX
      IF(JHATCH.NE.NCARHT)L3=NSTIND(JHATCH+1)-1
      DO 70 I=L2,L3
      IF(NTOTAL(I).NE.0) GO TO 80
   70 CONTINUE
      IF (NLAT(JSLOT).GT.0) GO TO 80
C
C           ERROR ROUTINE--CRAFT ASSIGNED TO AN EMPTY HATCH.
C
      WRITE(NPRINT,79)
   79 FORMAT(1X,47HCRAFT ASSIGNED TO AN EMPTY HATCH.  LOGIC ERROR.)
      CALL WCLOCK
      STOP
C
C     FIRST NON-EMPTY INDEX IS FOUND.
C
   80 L1=I
      NPHCAR(JHATCH)=
```



```
C
C
C           TRANSFER TO APPROPRIATE LOADING ROUTINE BASED ON SHIP TYPE.
C
      GOTO (100,200,300,100,200), ISTYP
C
C           GENERAL CARGO SHIP AND BREAKBULK SHIP LOADING ROUTINE
C
  100 CALL LDGEN
      GOTO 500
C
C           CONTAINER SHIP LOADING
C
  200 CALL LDCONS
      GOTO 500
C
C     LASH LOADING
C
  300 CALL LDLASH
  500 IF(JSLOT.EQ.ISLOT) GOTO 501
      NHSCUM(JSLOT,4)=NHSCUM(JSLOT,4)+LDTIME
      NHSCUM(JSLOT,3)=NHSCUM(JSLOT,3)-LDTIME
  501 CONTINUE
C           LOADING TIME IS SLOWEST HATCH SLOT.
      IF(LDTIME.GT.JTEMP)JTEMP=LDTIME
      IF(JSLOT.EQ.ISLOT) GOTO 180
      OTIME=LDTIME/3600.
      WRITE(NTAPE3,178) ICRAFT,JSLOT,OTIME
  178 FORMAT(1X,6HCRAFT,I3,27H  SECONDARY LOADING AT SLOT,I3,5H  FOR,F6.
     .2,8H  HOURS.)
  180 CONTINUE
      LDTIME=JTEMP
      ENTRY LEND19
C
C           ADD UNMOORING TIME.
C
      ITIME =LDTIME+MOORTM(ISLTYP,ICRTYP)*.5 +ITIME
      NCRCUM(ICRAFT,5)=NCRCUM(ICRAFT,5)+LDTIME
      NCRCUM(ICRAFT,6)=NCRCUM(ICRAFT,6)+MOORTM(ISLTYP,ICRTYP)*.5
C
C           WRITE RESULTS OF LOADING.
C
      OTIME=LDTIME/3600.
      OTIME1=ITIME/3600.
      WRITE(NTAPE,510)OTIME,OTIME1
  510 FORMAT(1X,14HLOADING TAKES ,F6.2,30HHOURS.  CRAFT TO LEAVE SLOT AT
     .,F9.2,8H  HOURS.)
C
C           GENERATE CRAFT LEAVES HATCH SLOT EVENT.
C
      ITEMP=MTIME+NCLOCK(ICRAFT)
      N=2
      IF(NCLOCK(ICRAFT).EQ.-1) N=1
      NCRCUM(ICRAFT,N)=NCRCUM(ICRAFT,N)+ITEMP
      NCLOCK(ICRAFT)=ITIME
      NHSCUM(ISLOT,4)=NHSCUM(ISLOT,4)+ CLOCK(ICRAFT)-MTIME
```

```
      NHSCRE(ISLOT,ICRTYP)=NHSCRE(ISLOT,ICRTYP)+1
      NCYCLE=NCRCYM(ICRAFT,1)+1
      ITEMP=MOPRTY(IFLTYP,ICRTYP)+1.5
      WRITE(NTAPE2,525) NCOLE(1),NCYCLE,ICRAFT,MTIME,ISLOT,ITEMP,ITRAV,
     .ITEMP,LDTIME
  525 FORMAT(1X,I2,11I4)
      WRITE(NTAPE2,528) (LCRCAR(ICRAFT,J),J=1,NCARTP)
  528 FORMAT(1X,I1,3I12)
      DO 550 J=1,NCARTP
C
C              UPDATE CUMULATIVE CRAFT CARGO
C
      IF(LCRCAR(ICRAFT,J).EQ.0) GOTO 550
      NCRCAR(ICRAFT,J)=NCRCAR(ICRAFT,J)+LCRCAR(ICRAFT,J)
C
C              ACCUMULATE WEIGHT, VOLUME, AND SQUARE.
C
      COUT(1)=COUT(1) + CARGWT(J)*LCRCAR(ICRAFT,J)
      IF((CARGCT(J).LT.-1.9).OR.(CARGCT(J).GT..01)) GOTO 540
C            NOT VEHICLE CARGO
      COUT(2)=COUT(2)+ CARGVL(J)*LCRCAR(ICRAFT,J)
C              IS ITEM A CONTAINER?
      IF((CARGCT(J).LT.-.9).AND.(CARGCT(J).GT.-1.1)) GOTO 530
      INC(1)=1
      GOTO 550
  530 INC(2)=1
      GOTO 550
C              VEHICLE CARGO
  540 COUT(2)=COUT(2) + CARGVL(J)*LCRCAR(ICRAFT,J)*CRAFHT(ICRTYP)
      COUT(3)=COUT(3) + CARGVL(J)*LCRCAR(ICRAFT,J)
      INC(3)=1
  550 CONTINUE
C
C              FIND LOAD CATEGORY.
C
      LCATE=5
      IF(INC(1).NE.1) GOTO 560
      LCATE=1
      IF(INC(3).EQ.1) LCATE=4
      GOTO 580
  560 IF(INC(2).EQ.1) GOTO 570
      LCATE=3
      IF(INC(3).EQ.1) GOTO 580
      LCATE=5
      GOTO 580
  570 LCATE=2
C
C              UPDATE CUMULATIVE PRODUCTIVITY STATISTICS
C
  580 INCRCY(ICRAFT,1)= LCATE
      KSTAT(ICRAFT,LCATE,1)=KSTAT(ICRAFT,LCATE,1)+1
      DO 590 J=1,3
  590 CSTAT(ICRAFT,LCATE,J)=CSTAT(ICRAFT,LCATE,J)+ COUT(J)
C
C              WRITE STATISTICAL LOADING RESULTS
C
  595 WRITE (NTAPE5,600)
      OTIME=MTIME/3600.
      WRITE(NTAPE5,600) ICRAFT,ICRAF(ICRAFT),ISLOT,ITHSLT(ISLOT),OTIME
     .,LCATE,OTIME1
  600 FORMAT(1X,22HLOADING RESULTS FOR CRAFT,I4, 9H  OF TYPE,I4,15H  AT
     .HATCH SLOT,I4, 5H  OF TYPE,I4,16H.  LOADING TIME-,F8.2,11H  CATEGO
     .RY-,I2/1X,11HSTART TIME-,F8.2,6H  HOURS.)
      WRITE(NTAPE5,610)
  610 FORMAT(18X,14HWEIGHT -TONS-    VOL. -CU-FT-    FLOOR SPACE  -SQ-FT-)
      LL=3
      IF(LCATE.LT.4) LL=2
      WRITE(NTAPE5,620) (COUT(J),J=1,LL)
  620 FORMAT(1X,12HLOAD CARRIED,3X,3F15.3)
C
C              CALCULATE EFFICIENCIES
C
      COUT(1) = COUT(1)*100./CRAFWT(ICRTYP)
      COUT(2) = COUT(2)*100./CRAFVL(ICRTYP)
      IF(LL.EQ.3) COUT(3)=COUT(3)*100./CRAFFS(ICRTYP)
      WRITE(NTAPE5,630) (COUT(J),J=1,LL)
  630 FORMAT(1X,12HEFFICIENCIES,3X,3F15.3)
C
C              WRITE CARGO CARRIED
C
      WRITE(NTAPE5,520)(LCRCAR(ICRAFT,J),J=1,NCARTP)
  520 FORMAT(1X,24HCRAFT CARGO BY TYPE IS--/1X,32I4/1X,32I4)
      WRITE(NTAPE5,800)
  800 FORMAT(1X,120(1H-))
      NEVTYP(ICRAFT)=2
      NOPFL(ICRAFT)=ISLOT
 1000 RETURN
      END
```

```
      SUBROUTINE MINCLK
C
C     SHIP-HATCH SLOT-SP VEHICLE EVENTS MINIMUM EVENT TIME--
C     FINDS MINIMUM EVENT TIME FOR SHIP CLOCK, HATCH SLOT CLOCK, AND SP
C     VEHICLE EVENT CLOCK AND PLACES TIME IN NCLKEL.
C
C*****
C
C              NOTE -- MINCLK COMMON 1 IS NON-STANDARD
C
C
      COMMON/A01/NCLOCK(100),NEVTYP(100),NOPEL(100),NELEMT(6),NCODE(20),
     .           NCLKEL,NLSTEL,NTIME,IEVTYP,JELEMT,JACTEL,INTCUM,INTPER,
     .LPTIME,LOTIME,NPRINT,NTAPE,NCARD,NTAPE1,NTAPE2,ICOUT,NTAPE3
C*****
      INTEGER* NEVTYP,        NOPEL ,         NELEMT,         NCODE        A1
C
C     SET LIMITS OF NCLOCK TO BE SEARCHED.
C
      L1=NCLKEL+2
      LTIME=NCLOCK(NCLKEL+1)
      IELEMT=NCLKEL+1
C     SEARCH LAST PART OF NCLOCK ARRAY
      DO 20 I=L1,NLSTEL
      IF((LTIME.LT.0).AND.((NCLOCK(I).LT.0).OR.(NCLOCK(I).GE.LTIME)))GO
     .TO 20
      LTIME=NCLOCK(I)
      IELEMT=I
   20 CONTINUE
C
C     FIND ADJUSTED ELEMENT NUMBER.
C
      IACTEL=IELEMT-NCLKEL
      IF(IACTEL.GT.NELEMT(3))IACTEL=IACTEL-NELEMT(3)
      IF(IACTEL.GT.NELEMT(4))IACTEL=IACTEL-NELEMT(4)
C
C     PLACE TIME AND ELEMENT NUMBERS INTO NCLKEL ELEMENT OF CLOCK.
C
      NOPEL(NCLKEL)=IELEMT
      NEVTYP(NCLKEL)=IACTEL
      NCLOCK(NCLKEL)=LTIME
      RETURN
      END
```



```
      SUBROUTINE OSTAT(LETIME)
C
C              OUTPUT STATISTICS--WRITES STATISTICS AT SPECIFIED INTER-
C              VALS AND/OR AT END OF RUN.
C
C*****
C
      COMMON/A01/NCLOCK(100),NEVTYP(100),NOPEL(100),NELEMT(6),NCODE(20),
     .           NCLKEL,NLSTEL,NTIME,IEVTYP,IELEMT,IACTEL,INTCUM,INTPER,
     .LPTIME,LOTIME,NPRINT,NTAPE,NCARD,NTAPE1,NTAPE2,ICOUT,NTAPE3
C
      COMMON/A02/CARWT(40),CARVL(40),CARCCT(40),NCARHL(40),NCGTAG(40)
C
      COMMON/A03/CRAFWT(10),CRAFVL(10),CRAFSP(10,4),CRAFHT(10),NCRAFM(10
     .),MULHAT(10),NCCITY(10,40),NFILE(10),CRAFFS(10)
C
      COMMON/A06/NCRTYP(10),NTKTYP(10),NLSTYP(15),NMHTYP(15,3),IDCRAF(30
     .),IDTRUK(30),IDLUS(30),IDSDVH(20),
     .            NCARTP,NCRFTP,NTRKTP,NLLSTP,NMHETP,NHTSTP,NCARHT,NMHEFL
     ..NLUS,NSI,NTASTP
C
      COMMON/A08/LCRCAR(30,40),LTKCAR(30,40),LSTCAR(3,40)
C
      COMMON/A13/NCRCUM(30,15),NTKCUM(30,9),MHECYC(15,3,2),MHECAR(15,3,
     .40),MHECUM(15,3, 4),LUSUSE(30,10),LUSCUM(30,2),NSTCUM(2,40),NHSCUM
     .(20,7),NHSFRE(20,10),NTRAFF(2),NCRCAP(30,40),INDEYC(30,2),KSTAT(30
     .,4,2),CSTAT(30,4,3)
C*****
      INTEGER*2NEVTYP,        NOPEL ,         NELEMT,         NCODE        A1
      INTEGER*2NCARHL,        NCGTAG                                       A2
      INTEGER*2NCRAFM,        MULHAT,         NCCITY,         NFILE        A3
      INTEGER*2NCRTYP,        NTKTYP,         NLSTYP,         NMHTYP       A4
      INTEGER*2IDCRAF,        IDTRUK,         IDLUS ,         IDSDVH       A6
      INTEGER*2LCRCAR,        LTKCAR,         LSTCAR                       A8
      DIMENSION KOUT(5,2),COUT(5,3),KTOUT(5,2),CTOUT(5,3),KCARS2(40)
      KCNT=2
      KITIME=0
C
C              WRITE HEADING.
C
      ETIME= LETIME/3600.
      WRITE(NTAPE1,10) ETIME
   10 FORMAT(20H1CRAFT STATISTICS AT,F8.2,7H  HOURS)
      IF( ICOUT.EQ.3) GOTO 1600
C
C              CALCULATE AND WRITE INDIVIDUALS CRAFT STATISTICS.
C
      WRITE(NTAPE1,20)
   20 FORMAT(1X//1X,16HINDIVIDUAL CRAFT)
C
C              LOOP FOR EACH CRAFT.
C
      L2= NELEMT(1)
      DO 1.0 I=1,L2
C
C              NEXT CRAFT, IF THIS ONE IS UNUSED.
```

```
C
      DO 25 J=1,4
      IF(CSTAT(I,J,1).GT..0001) GOTO 26
   25 CONTINUE
      GOTO 100
C
C            TEST FOR PAGE SPACE.
C
   26 IF(KCNT.GE.1) GOTO 40
      KCNT=1
      WRITE(NTAPE1,30)
   30 FORMAT(1H1)
      GOTO 60
   40 KCNT=KCNT-1
      WRITE(NTAPE1,50)
   50 FORMAT(1X//1X)
C
C            HEADING FOR CRAFT
C
   60 ICRTYP=IDCRAF(I)
      WRITE(NTAPE1,70)I,ICRTYP
   70 FORMAT(1X, 9HCRAFT ID-,I3, 7H  TYPE-,I3)
C
C            CRAFT STATISTICS IN TEMPORARY ARRAY FOR USE IN SUBROUTINE.
C
      DO 90 J=1,4
      COUT(J,3)=CSTAT(I,J,3)
      DO 90 K=1,2
      KOUT(J,K)= KSTAT(I,J,K)
   90 COUT(J,K)= CSTAT(I,J,K)
   93 CONTINUE
C
C            CALL CALCULATION AND PRINT SUBROUTINE.
C
      CALL PSTAT(KOUT,COUT,LETIME,ICRTYP)
  100 CONTINUE
      WRITE(NTAPE1,30)
C
C            CALCULATE AND WRITE CRAFT TYPE STATISTICS.
C
 1000 WRITE(NTAPE1,1010)
 1010 FORMAT(1X//1X,11HCRAFT TYPES)
C
C            RESET TEMPORARY TOTAL SYSTEM ARRAYS TO ZERO.
C
      DO 1020 J=1,4
      CTOUT(J,3)=0.
      DO 1015 K=1,2
      KTOUT(J,K)=0
 1015 CTOUT(J,K)=0.
 1020 CONTINUE
C
C            LOOP FOR EACH CRAFT TYPE.
C
      KCNT=2
      DO 1500 I=1,NCRFTP
```



```
C
C            ANY CRAFT OF THIS TYPE IN SYSTEM?
C
      IF(NCRTYP(I).EQ.0)GOTO 1500
C
C            RESET TEMPORARY ARRAYS TO ZERO.
C
      DO 1025 J=1,4
      COUT(J,3)=0.
      DO 1022 K=1,2
      KOUT(J,K)=0
 1022 COUT(J,K)=0.
 1025 CONTINUE
      DO 1028 J=1,NCARTF
 1028 KCARGO(J) =0
C
C            TEST FOR PAGE SPACE.
C
      IF(KCNT.GE.1) GOTO 1030
      KCNT=1
      WRITE(NTAPE1,30)
      GOTO 1040
 1030 KCNT=KCNT-1
      WRITE(NTAPE1,50)
C
C            LOOP THROUGH CRAFT CLOCK.
C
 1040 JCNT=0
      LCNT=0
      L2=NELEMT(I)
      DO 1300 J=1,12
C
C             IS CRAFT OF CURRENT TYPE?
C
      IF(IDCRAF(J).EQ.I) GOTO 1070
      IF(LCNT.EQ.1) GOTO 1400
      GOTO 1300
C
C            CRAFT OF CURRENT TYPE IS FOUND.
C            LOOP FOR EACH CARGO CATEGORY.
C
 1070 LCNT=1
      IF(NCRCUM(J,1).EQ.0) GOTO 1400
      JCNT=JCNT+1
      DO 1200 K=1,4
C
C            ACCUMULATE STATISTICS FOR CRAFT
C            TYPE, AND FOR TOTAL CRAFT SYSTEM
C
      COUT(K,3)=COUT(K,3)+CSTAT(J,K,3)
      CTOUT(K,3)=CTOUT(K,3)+CSTAT(J,K,3)
      DO 1100 L=1,2
      COUT(K,L)=COUT(K,L)+CSTAT(J,K,L)
      CTOUT(K,L)=CTOUT(K,L)+CSTAT(J,K,L)
      KOUT(K,L)=KOUT(K,L)+KSTAT(J,K,L)
 1100 KTOUT(K,L)=KTOUT(K,L)+KSTAT(J,K,L)
```

```
 1200 CONTINUE
C
C           ACCUMULATE TOTAL CARGO CARRIED FOR THIS CRAFT TYPE.
C
      DO 1210 K=1,NCARTP
 1210 KCARGO(K)=KCARGO(K)+KCRCAR(J,K)
 1250 CONTINUE
 1400 KTIME=ELETIME+JCNT
      KITIME=KITIME+KTIME
      IDUM=1
C
C           HEADING FOR CRAFT TYPE.
C
      WRITE(NTAPE1,1050)I,NCRAFR(I),JCNT
 1050 FORMAT(2X,11HCRAFT TYPE--,I3,7H  MODE--,I2,27H NUMBER OF CRAFT UTILI
     .ZED--,I3)
C
C           CALL CALCULATION AND PRINT
C           SUBROUTINE FOR CRAFT TYPE.
C
      CALL ESTAT(KCOUT,COUT,KTIME,IDUM)
C
C           PRINT CARGO CARRIED BY THIS CRAFT TYPE.
C
      WRITE(NTAPE1,1410) (KCARGO(K),K=1,NCARTP)
 1410 FORMAT(1X/1X,21HTOTAL CARGO CARRIED--/1X,30I4/1X,30I4)
 1500 CONTINUE
C
C           HEADING TOTAL CRAFT SYSTEM.
C
      WRITE(NTAPE1,1510)
 1510 FORMAT(19H1TOTAL CRAFT SYSTEM)
C
C           CALL CALCULATION AND PRINT
C           SUBROUTINE FOR TOTAL SYSTEM.
C
      CALL ESTAT(KTOUT,CTOUT,KITIME,0)
C
C           CALCULATION OF TOTAL PRODUCTIVITIES.
C
      WT=0.
      DO 1530 I=1,NCARTP
 1530 WT=WT+LSTCAR(3,I)*CARGWT(I)
      WT=WT/TTIME
      WRITE(NTAPE1,1540)(LSTCAR(3,I),I=1,NCARTP)
 1540 FORMAT(1X//1X,22HCARGO MOVED TO DEPOT--/1X,30I4/1X,30I4)
      WRITE(NTAPE1,1550) WT
 1550 FORMAT(1X,21HDEPOT PRODUCTIVITY--,F10.3,9H  TONS/HR)
      RETURN
      END
```



```
      SUBROUTINE PERGUT
C
C           PERIODIC OUTPUT---WRITES PERIODIC OUTPUT STATISTICS AT A
C           SPECIFIC INTERVAL.
C
C*****
C
      COMMON/A01/ELTEK(100),NEVTYP(100),NOPEL(100),NELEMT(6),NCODE(20),
     .           CELKEL,FLCTEL,MTIME,IEVTYP,IELEMT,IACTEL,INTCUR,INTECR,
     .LPTIME,LSTIME,NERINT,NTAPE,NCAPD,NTAPE1,NTAPE2,ICOUT,NTAPE3
C
      COMMON/A02/CARGWT(40),CARGVL(40),CARGCT(40),ICARHL(40),NCGTAG(40)
C
      COMMON/A06/NCRTYP(10),NTKTYP(10),NLSTYP(15),NMHTYP(15,3),IDCRAF(30
     .),IDTRUK(30),IDLUS(30),IPSDVH(20),
     .           NCARTP,NCEETP,NTRKTP,NLUSTP,NMHETP,NHTSTP,NCAPHT,NMHEPL
     .,NLUS,NSI,NTASTF
C
      COMMON/A08/LCRCAR(30,40),LTKCAS(30,40),LSTCAR(3,40)
C
      COMMON/A13/NCRCUM(30,15),NTKCUM(30,9),MHECYC(15,3,2),MHECAP(15,3,
     .40),MHECUM(15,3, 4),LUSUSE(30,10),LUSCUM(30,2),NSTCUM(2,40),MHECUM
     .(20,7),NHSCRF(20,10),NTRAFF(2),NCPCAR(30,40),IMCCYC(30,2),KSTAT(30
     .,4,2),CSTAT(30,4,3)
     .,MHEREQ(15,3),MHETOT(15,3)
C*****
      INTEGER*2NEVTYP,       NOPEL ,        NELEMT,        NCODE        A1
      INTEGER*2NCARHL,       NCGTAG                                     A2
      INTEGER*2NCRTYP,       NTKTYP,        NLSTYP,        NMHTYP       A6
      INTEGER*2IDCRAF,       IDTRUK,        IDLUS ,        IPSDVH       A6
      INTEGER*2LCRCAR,       LTKCAR,        LSTCAR                      A8
C
C           UPDATE MHE REQUIREMENT.
C
      DO 50 I=1,NMHEPL
      DO 50 J=1,NMHETP
      IF((MHETOT(J,I)-NMHTYP(J,I)).GT.MHEREQ(J,I)) MHEREQ(J,I)=MHETOT(J,
     .I)-NMHTYP(J,I)
   50 CONTINUE
      RETURN
      END
```

```
      SUBROUTINE PSTAT(KOUT,COUT,KTIME,ICRTYP)
C
C            PRINTS TABLE OF STATISTICS FOR A CRAFT OR SET OF CRAFT.
C
C
C.....
C
      COMMON/A01/ICLOCK(125),NEVTYP(100),NOPEL(100),NELEMT(6),NCODE(20),
     .            ICLKEL,NLSTEL,MTIME,IEVTYP,IFLEMT,IACTEL,INTCUM,INTPER,
     .LPTIME,LPTIME,IPRINT,NTAPE,NCARD,NTAPE1,NTAPE2,ICOUT,NTAPE3
C
      COMMON/A02/CARGWT(40),CARGVL(40),CARGCT(40),NCARRL(40),NCGTAG(40)
C
      COMMON/A03/CRAFWT(10),CRAFVL(10),CRAFCP(10,4),CRAFHT(10),NCRAFM(10
     .),MULHAT(10),NCCITM(10,40),NFILE(10),CRAFFS(10)
C.....
      INTEGER*2NEVTYP,        NOPEL ,        NELEMT,        NCODE        A1
      INTEGER*2NCARRL,        NCGTAG                                     A2
      INTEGER*2NCRAFM,        MULHAT,        NCCITM,        NFILE        A3
      DIMENSION KOUT(5,2),COUT(5,3),STAT(5)
C
C            INITIALIZE TOTALS TO ZERO
C
      COUT(5,3)=0.
      DO 5 I=1,2
      KOUT(5,I)=0
    5 COUT(5,I)=0.
C
C            PRINT HEADING
C
      WRITE(NTAPE1,10)
   10 FORMAT(1X/35X,13HGENERAL CARGO,5X,10HCONTAINERS,7X,8HVEHICLES,4X,1
     .1HCARGO MIXED,4X,11HTOTAL CARGO/1X)
C
C            ACCUMULATE TOTALS
C
      DO 30 I= 1,4
      COUT(5,3)=COUT(5,3)+COUT(I,3)
      DO 20 J= 1,2
      KOUT(5,J)=KOUT(5,J)+KOUT(I,J)
   20 COUT(5,J)=COUT(5,J)+COUT(I,J)
   30 CONTINUE
C
C            PRINT CYCLES
C
      WRITE(NTAPE1,40)(KOUT(I,1),I=1,5)
   40 FORMAT(1X,16HNUMBER OF CYCLES,10X,5I15)
C
C            PRINT TIMES UTILIZED
C
      DO 50 I=1,5
   50 STAT(I)=KOUT(I,2)/3600.
      WRITE(NTAPE1,60) (STAT(I),I=1,5)
   60 FORMAT(1X,21HTIME UTILIZED (HOURS),5X,5F15.3)
C
C            PRINT WEIGHT CARRIED.
C
      WRITE(NTAPE1,1001) (COUT(I,1),I=1,5)
 1001 FORMAT(1X/1X,21HWEIGHT CARRIED (TONS),9X,5F15.3)
C
C            PRINT WEIGHT EFFICIENCY, UNLESS STATISTICS
C            ARE FOR TOTAL SYSTEM.
C
      IF(ICRTYP.EQ.0) GOTO 90
      DO 70 I=1,5
      STAT(I)=0.
      IF(KOUT(I,1).EQ.0) GOTO 70
      STAT(I)=(COUT(I,1)/(KOUT(I,1)*CRAFWT(ICRTYP)))*100.
   70 CONTINUE
      WRITE(NTAPE1,80)(STAT(I),I=1,5)
   80 FORMAT(1X,17HWEIGHT EFFICIENCY,14X,5(F14.3,1H%))
C
C            PRINT WEIGHT PRODUCTIVITY/CRAFT-HOUR.
C
   90 DO 100 I=1,5
      IF(KTIME.EQ.0) GOTO 115
  100 STAT(I)= COUT(I,1)/(KTIME/3600.)
      GOTO 115
  109 CONTINUE
      WRITE(NTAPE1,110) (STAT(I),I=1,5)
  110 FORMAT(1X,26HPRODUCTIVITY (TONS/CRAFT-HR),2X,5F15.3/1X,26H(TONS/HR
     . FOR CRAFT SYSTEM)/1X)
C
C            PRINT WT. PRODUCTIVITY/CRAFT-HR. UTILIZED
  115 DO 120 I=1,5
      STAT(I)=0.
      IF(KOUT(I,2).EQ.0) GOTO 120
      STAT(I)= COUT(I,1)/(KOUT(I,2)/3600.)
  120 CONTINUE
      WRITE(NTAPE1,130)(STAT(I),I=1,5)
  130 FORMAT(1X,30HPROD. (TONS/CRAFT-HR UTILIZED),5F15.3)
C
C            PRINT VOLUME CARRIED.
C
      WRITE(NTAPE1,1010) (COUT(I,2),I=1,5)
 1010 FORMAT(1X/1X,22HVOLUME CARRIED (CU FT),8X,5F15.3)
C
C            PRINT VOLUME EFFICIENCY, UNLESS
C            STATISTICS ARE FOR TOTAL SYSTEM
C
      IF(ICRTYP.EQ.0)GOTO 160
      DO 140 I=1,5
      STAT(I)=0.
      IF(KOUT(I,1).EQ.0) GOTO 140
      STAT(I)=(COUT(I,2)/(KOUT(I,1)*CRAFVL(ICRTYP)))*100.
  140 CONTINUE
      WRITE(NTAPE1,150)(STAT(I),I=1,5)
  150 FORMAT(1X,17HVOLUME EFFICIENCY,14X,5(F14.3,1H%))
C
C            PRINT VOLUME PRODUCTIVITY/CRAFT-HOUR
C
  160 DO 170 I=1,5
```

```
      IF(KTIME.EQ.0) GOTO 165
  170 STAT(1)=COUT(1,2)/(KTIME/3600.)
      GOTO 165
  179 CONTINUE
      WRITE(NTAPE1,180) (STAT(I),I=1,5)
  180 FORMAT(1X,30HPRODUCTIVITY (CU.FT./CRAFT-HR),F15.3/1X,33H(CU.FT/HR
     . FOR TOTAL CRAFT SYSTEM)/1X)
C
C            PRINT VOLUME PRODUCTIVITY/CRAFT-HR. UTILIZED.
C
  185 DO 190 I=1,5
      STAT(I)=0.
      IF(KOUT(I,2).EQ.0) GOTO 190
      STAT(I)=COUT(I,2)/(KOUT(I,2)/3600.)
  190 CONTINUE
      WRITE(NTAPE1,200) (STAT(I),I=1,5)
  200 FORMAT(1X,20HPROD (CU.FT/CRAFT-HR UTILIZED),5F15.3)
C
C            PRINT FLOOR SPACE (SQ. FT.) EFFICIENCY, PRODUCTIVITY/CRAFT
C            -HR, PRODUCTIVITY/CRAFT-HR UTILIZED
C
      IF(ICRTYP.EQ.0) GOTO 208
      STAT(2)=0.
      STAT(1)=0.
      IF(KOUT(3,1).EQ.0) GOTO 208
      STAT(1)=(COUT(3,3)/(KOUT(3,1)*CRAFFS(ICRTYP)) )*100.
  208 IF(KTIME.EQ.0) GOTO 207
      STAT(2)=COUT(3,3)/(KTIME/3600.)
  207 STAT(3)=0.
      IF(KOUT(3,2).EQ.0) GOTO 209
      STAT(3)=COUT(3,3)/(KOUT(3,2)/3600.)
  209 WRITE(NTAPE1,1020) COUT(3,3)
 1020 FORMAT(1X/1X,22HSQUARE CARRIED (SQ FT),38X,F15.3)
      IF(ICRTYP.NE.0) WRITE(NTAPE1,1030) STAT(1)
 1030 FORMAT(1X,18HSQ. FT. EFFICIENCY,43X,F14.3,1H%)
  211 WRITE(NTAPE1,210)(STAT(I),I=2,3)
  210 FORMAT(1X,31HPROD. (SQ.FT/CRAFT-HR UTILIZED),29X,F15.3)
C
C            PRINT PERCENT UTILIZATION.
C
      STAT(1)=0.
      IF(KTIME.EQ.0) GOTO 219
      STAT(1)= KOUT(1,2)*100./KTIME
  219 WRITE(NTAPE1,220) STAT(1)
  220 FORMAT(1X/1X,20HPERCENT UTILIZATION-,F19.4)
      RETURN
      END
```



```
      SUBROUTINE RDDATA
C
C            READ ALL PERMANENT DATA FROM CARDS.
C
C*****
C
      COMMON/A01/NELOCK(100),NEVTYP(100),NOPEL(100),NELEMT(6),NCODE(20),
     .           NELKEL,NLSTEL,MTIME,IEVTYP,IELEMT,IACTEL,INTCUM,INTPER,
     .LPTIME,LOTIME,NPRINT,NTAPE,ICARD,NTAPE1,NTAPE2,ICOUT,NTAPE3
C
      COMMON/A02/CARGWT(40),CARGVL(40),CARGCT(40),NCARFL(40),NCGTAG(40)
C
      COMMON/A03/CRAFWT(10),CRAFVL(10),CRAFSP(10,4),CRAFHT(10),NCRAFM(10
     .),MULHAT(10),NCCITM(10,40),NFILE(10),CRAFFS(10)
C
      COMMON/A04/TRUKWT(10),TRUKVL(10),TRUKSP(10,2),NTCITM(10,40),NPRTRK
     .(10,13),NPRTCG(30),MHEPRY(10,10,13),MHETRK(30),LDGTTM(13,15,10),LD
     .IGTM(13,15,10),
     .           NPRCAR,IPRTRK,ITRUCK,NTRUKS,NTRKEP
C
      COMMON/A05/NESSHP( 5),NCHSHP( 5),IDSHIP( 5),NHPHS(20),IDHSLT(20),
     .NCHCOR(20),LHCHS(20),NHATSS(20),NSTYP(20),NHATNO(20),IDCARH(20),NS
     .ROOM(20),NSTINC(20),NHATIX(100),NDCP(100),NACCES(100),NTOTAL(100),
     .NHITAB(100,40),NESSI(5),
     .           ICHCOR,LINDEX
C
      COMMON/A06/NCRTYP(10),NTKTYP(10),NLSTYP(15),NMHTYP(15,3),IDCRAF(30
     .),IDTRUK(30),IDLUS(30),IDSDVR(20),
     .           NCARTP,NCRFTP,NTRKTP,NLUSTP,NMHETP,NHTSTP,NCARHT,NMHCPL
     .,NLUS,NSI,NTAGTP
C
      COMMON/A07/DIST( 3),CAPST(3),ACAPST(3),LUSCRF(30),LUSTRK(30),LUSMH
     .E(30),LUSLOC(15),LUSSTT(15),LDCGTM(13,15,10),LDCTTM(13,15,10)
C
      COMMON/A08/LCRCAR(30,40),LTKCAR(30,40),LMTCAR(3,40)
C
      COMMON/A09/LISTCF(30),LISTHS(24),NSORT(50),NPRCAR(20),NUTHC(1 ,10
     .,13),
     .           NLISCR,NLISHS,ISLOT,ICRAFT
C
      COMMON/A10/MHOPTM(10,10),LOADTM(10,10,10),
     .NPDT,CHECKE,PRTMPO,NPTMIS,NSET,NCINT,CHELOD,FIT
C
      COMMON/A11/NCITEM(40),WPLAT(  ),
     .           ITIME,LCTIME,JSLOT,JHATCH,WEIGHT,VOLUME,LI,LJ,CCWT,CCVL
     .           ,INDEX,NCOUNTR,CCFT,FLOOR
C
      COMMON/A12/LUSOUF(30),NPECC(30),NPRLUS(15,10,13),NMHPR(15,10,13)
     .,LUSLIS(16),LUSHTM(13,15),LUSSPT(1 , ),
     .           LUS     NLUSPR,LUSPR
C
      COMMON/A13/MHRCUM(30,15),NTKCUM(30,9),MHECYC(15,3, ),MHECAP(15,3,
     .40),MHECUM(15,3, 4),LUSUSE(40,10),LUSCUM(30,2),NCTCUM(2,40),
     .(20,7),NHSCUM(20,10),NTRAFF(2),NCPCAR(30,40),INECYC(5, ),STAT(5
     .,4,3),CSTAT(  ,4,3)
     .,MHETPO(15,3),MHETOT(15,3)
```

```
C*****
      INTEGER*2NEVTYP,         NFEL ,         NFLEET,        NCOPE        A1
      INTEGER*2NCARFL,         NCCTAG                                     A2
      INTEGER*2NCRAFN,         MULHAT,        NECITS,        NFILE        A3
      INTEGER*2NCITTS,         NCRTPK,        NECTCL,        MHRSKY       A4
      INTEGER*2NEFTRK,         LDGTIM,        LDTGTM                      A4
      INTEGER*2NFSSIF,         NCHSEP,        IPSHIP,        NSHPHS       A5
      INTEGER*2NCICLT,         NCHCAR,        LOCHS ,        NHATSS       A5
      INTEGER*2NSTYP ,         NHATEC,        IDCARE,        NSROOM       A
      INTEGER*2NSTINC,         NHATIX,        NDCH ,         NACCES       A5
      INTEGER*2NTOTAL,         NETTAF,        NSSSI                       A5
      INTEGER*2NCRTYP,         NTKTYP,        NLSTYP,        NMHTYP       A6
      INTEGER*2IECHAF,         IFTRUK,        IDLUS ,        IDSDVH       A6
      INTEGER*2LUSCRF,         LUSTRK,        LUSMHE,        LUSLOC       A7
      INTEGER*2LUSSTT,         LDCGTM,        LDCTTM                      A7
      INTEGER*2LCHCAR,         LTKCAR,        LSTCAR                      A8
      INTEGER*2LISTCR,         LISTES,        NSGRT ,        NPRCAR       A9
      INTEGER*2NFRCHC                                                     A9
      INTEGER*2MOOBTM,         LOADTM                                     A10
      INTEGER*2NCITEM,         NPLAT                                      A11
      INTEGER*2LUSCUE,         NPRCCG,        NPFLUS,        NPRMHF       A12
      INTEGER*2LUSLIS,         LUSBTM,        LUSSPT                      A12
      DIMENSION CITIMF(40),NALPHA(20)
C
C     TITLE OF RUN - 2 CARDS
C
      WRITE(NPRINT,1105)
      DO 10 I=1,2
      READ(NCARD,1100)(NALPHA(J),J=1,20)
   10 WRITE(NPRINT,1110)(NALPHA(J),J=1,20)
      WRITE(NPRINT,1120)
 1100 FORMAT(20A4)
 1105 FORMAT(1H1)
 1110 FORMAT(1X,20A4)
C
C     READ PERMANENT DATA
C
C
C     HEADING -- PERMANENT INPUT DATA
C
      WRITE(NPRINT,100)
  100 FORMAT(1X,22HPERMANENT INPUT DATA--///1X)
C
C     READ CARGO TYPE DATA.
C
      READ(NCARD,102)NCARTP
      WRITE(NPRINT,102)NCARTP
  102 FORMAT(1X,24HNUMBER OF CARGO MODULES=,I5)
C     HEADINGS
      WRITE(NPRINT,104)
  104 FORMAT(1X,4HNAME,22X,14HCARGO PRIORITY,2X,13HWEIGHT (TONS),3X,12HV
     *OL.(CU.FT.),7X,8HCATEGORY,5X,10HHEAVY LIFT,4X,11HCARGO (TAG)/26X,
     *15H(MODULE NUMBER),18X,12H(FLOOR SPACE)
      L2=NCARTP+1
      DO 106 I=1,L2
      READ(NCARD,107) (NALPHA(J),J=1,4),IPR,CARGWT(IPR),CARGVL(IPR),CARG
     *CT(IPR),NCARFL(IPR),NCGTAG(IPR)
  106 WRITE(NPRINT,108)(NALPHA(J),J=1,4),IPR,CARGWT(IPR),CARGVL(IPR),CAR
     *GCT(IPR),NCARFL(IPR),NCGTAG(IPR)
  107 FORMAT(4A4,1X,I7,3F7.2,2I7)
  108 FORMAT(1X,4A4,9X,I15,3F15.3,2I15)
C
C          WRITE LEGEND FOR CARGO CODES.
C
      WRITE(NPRINT,8600)
 8600 FORMAT(1X///1X,14HCARGO LEGEND--/1X,10HCATEGORY--,40X,11HHEAVY LIFT
     *--/1X,5HPOSITIVE-   SD VEHICLE-SPEED IN MPH-,14X,20H1-   HEAVY LI
     *FT ITEM/4X,22H0.000-   GENERAL CARGO,25X,15H2-   CONTAINER /3X,20H
     *-1.000-   CONTAINERS,20X,23H3-   REGULAR-SIZED ITEM/
     *3X,20H-2.000-   NSE VEHICLES///1X,20HLOADING CATEGORIES--/2X,14H1-
     *   GENERAL CARGO/2X,15H2-   CONTAINERS/2X,13H3-   VEHICLES/2X,14H4
     *-   CARGO NET)
C
C          READ CARGO (TAGS).
C
      READ(NCARD,1 00) NTAGTP
      WRITE(NPRINT,8500)NTAGTP
 8500 FORMAT(1H1,21HNUMBER OF CARGO TAGS=,I5///1X,10HTAG NUMBER, X,11HDES
     *CRIPTION/1X)
      DO 8510 IXX = 1,NTAGTP
      READ(NCARD,8520)   I,(NALPHA(J),J=1,17)
 8510 WRITE(NPRINT,8530) I,(NALPHA(J),J=1,17)
 8520 FORMAT(I8,4X,17A4)
 8530 FORMAT(2X,I1 ,9X,17A4)
C
C     READ CRAFT + TRUCK PERFORMANCE DATA
C
      WRITE(NPRINT,120)
  120 FORMAT(1H1,35HCRAFT AND TRUCK PERFORMANCE DATA--)
C     HEADINGS
      WRITE(NPRINT,125)
  125 FORMAT(1X,4HNAME,15X,11HTYPE NUMBER,6X,8HCAPACITY,21X,  21X
     *,6HWEIGHT,6X,6HCRAFT,4X,  11-/ X,6HWEIGHT,4X,  VOLUME,  X,10HLA
     *ND -MPH-,9X,11HSEA -KNOT-,1X,  -FT.-,  ,4H   ,  X,  HATCH/   ,
     *-TONS-,  X,  -CU.FT.-,2(5X,  EMPTY,4X,  ),  X,4H   )
      WRITE(NPRINT,130)
  130 FORMAT(1X/1X,10HCRAFT DATA)
C
C     READ CRAFT DATA
C
      READ(NCARD,100)NCRFTP
      WRITE(NPRINT,132)NCRFTP
  132 FORMAT(1X,22HNUMBER OF CRAFT TYPES=,I5)
      DO 7000 I=1,NCRFTP
      READ(NCARD,142)   (NALPHA(J),J=1,4),CRAFWT(I),CRAFVL(I),(CRAFSP(I,J
     *),J=1,4),CRAFHT(I),NCRAFM(I),MULHAT(I)
      WRITE(NPRINT,144)(NALPHA(J),J=1,4),I,CRAFWT(I),CRAFVL(I),(CRAFSP(I
     *,J),J=1,4),CRAFHT(I),NCRAFM(I),MULHAT(I)
      WRITE(NPRINT,145)
      READ(NCARD,148)(CCITM(I,J),J=1,L2)
      WRITE(NPRINT,150)(CCITM(I,J),J=1,L2)
      READ(NCARD ,7000)NFILE(I),CLAFES(I)
```

```
      WRITE(NPRINT,7110)NFILE(I),CRAFT(I)
 7100 CONTINUE
C
C     READ TRUCK DATA
C
      WRITE(NPRINT,134)
      READ(NCARD,1000)NTRKTP
      WRITE(NPRINT,140) NTRKTP
      DO 136 I=1,NTRKTP
      READ(NCARD,142)  (NALPHA(J),J=1,4),TRUKWT(I),TRUKVL(I),(TRUKSP(I,J
     .),J=1,2)
      WRITE(NPRINT,144)(NALPHA(J),J=1,4),I,TRUKWT(I),TRUKVL(I),(TRUKSP(I
     .,J),J=1,2)
      WRITE(NPRINT,146)
      READ(NCARD,148)  (NTCITM(I,J),J=1,L2)
  136 WRITE(NPRINT,150)(NTCITM(I,J),J=1,L2)
  138 FORMAT(1X//1X,10HTRUCK DATA)
  140 FORMAT(1X,22HNUMBER OF TRUCK TYPES=,I5)
  142 FORMAT(4A4,1X,7F7.2,2I7)
  144 FORMAT(1X//1X,4A4, 4X,I10,7F10.2,2I10)
  146 FORMAT(1X,25HNUMBER OF ITEMS/CARGO MODULE--)
 7109 FORMAT(I8,F8.2)
 7110 FORMAT(1X,16HCONTAINERS/FILE=,I5,5X,12HFLOOR SPACE=,F10.2,8H  SQ.F
     .T.)
C
C             WRITE LEGEND FOR CRAFT CODES.
C
      WRITE(NPRINT,8010)
 8010 FORMAT(1X//1X,14HCRAFT LEGEND--/1X,13HCRAFT MODES--,27X,18HMULTI-H
     .ATCH CODE--/3X,15H1-   LANDING CRAFT,20X,12HXY    WHERE--/3X,19H2-
     .  SEMI-AMPHIBIAN,22X,38HX   IS NUMBER OF -BLOCKED- HATCH SLOTS/3X,
     .19H3-   TRUE-AMPHIBIAN,22X,61HY   IS NUMBER OF HATCH SLOTS THAT CA
     .N LOAD CRAFT CONCURRENTLY/3X,33H4-   SURFACE EFFECT VEHICLE -SEV-/
     .3X,34H5-   BARGE DISCHARGE LIGHTER -BDL-/3X,15H6-   HELICOPTER/3X,
     .24H7-   TUG -TO TOW BARGES-/3X,22H8-   SEV/LANDING CRAFT)
C
C             READ LUS DATA
C
      READ(NCARD,1000)NLUSTP
      WRITE(NPRINT,1152)NLUSTP
 1152 FORMAT(1H1,20HNUMBER OF LUS TYPES=,I5)
      WRITE(NPRINT,2153)
 2153 FORMAT(1X,8HLUS NAME,24X,8HLUS TYPE,7X,8HLOCATION,6X,10HMHE STATUS
     .)
      WRITE(NPRINT,2151)
      DO 2150 I=1,NLUSTP
      READ(NCARD,164)(NALPHA(J),J=1,4),IPR,LUSLOC(IPR),LUSSTT(IPR)
 2150 WRITE(NPRINT,166)(NALPHA(J),J=1,4),IPR,LUSLOC(IPR),LUSSTT(IPR)
C
C     NUMBER OF MOBILE MHE TYPES + POOLS
C
      READ(NCARD,1000)NMHETP,NMHEPL
      WRITE(NPRINT,1154)NMHETP,NMHEPL
 1154 FORMAT(1X///1X,22HNUMBER OF MOBILE MHE TYPES=,I5,5X,2HIN,I2,11H MH
     .E POOLS.)
      WRITE(NPRINT,2154)
```



```
 2154 FORMAT(1X,8HMHE NAME, 4X,8HMHE TYPE)
      WRITE(NPRINT,2161)
      L2=NMHETP+1
      DO 2160 I=1,L2
      READ(NCARD,164)(NALPHA(J),J=1,4),IPR
      WRITE(NPRINT,166)(NALPHA(J),J=1,4),IPR
 2160 CONTINUE
C
C             WRITE LEGEND FOR LUS/MHE CODES.
C
      WRITE(NPRINT,8020)
 8020 FORMAT(1X//1X,15HLUS/MHE LEGEND--/1X,11HLOCATIONS--,29X,12HMHE STA
     .TUS--/3X,10H1-   BEACH,30X,20H1-   FIXED -SEA-WALL CRANE-/3X,34H2-
     .  IN-TRANSIT STORAGE SITE -ISS-,6X,16H2-   SEMI-MOBILE/3X,10H3-
     . DEPOT,30X,20H3-   MOBILE -FROM POOL-/3X,13H4-   CAUSEWAY,27X,40H4
     .-   PSEUDO -NO MHE, USUALLY HELICOPTER-/43X,17H5-   CAUSEWAY MHE)
C
C     READ PERMANENT HATCH SLOT DATA.
C
C     NUMBER OF HATCH SLOT TYPES.
      READ(NCARD,1000)NHTSTP
      WRITE(NPRINT,1120)
      WRITE(NPRINT,156) NHTSTP
  156 FORMAT(1X,27HNUMBER OF HATCH SLOT TYPES=,I5)
      WRITE(NPRINT,160)
  160 FORMAT(1X,15HHATCH SLOT NAME,10X,15HHATCH SLOT TYPE,5X,9HSHIP TYPE
     .)
      WRITE(NPRINT,2161)
      DO 162 I=1,NHTSTP
      READ(NCARD,164)(NALPHA(J) ,J=1,4),IPR,NSTYP(IPR)
  162 WRITE(NPRINT,166)(NALPHA(J),J=1,4),IPR,NSTYP(IPR)
C
C             WRITE LEGEND FOR SHIP TYPE CODES
C
      WRITE(NPRINT,8030)
 8030 FORMAT(1X//1X,12HSHIP TYPES--/3X,23H1-   GENERAL CARGO SHIP/3X,31H
     .2-   CONTAINER SHIP -SS OR NSS-/3X,25H3-   LASH -BARGE CARRIER-/3X
     .,11H4-   RO/RO SHIP)
C
C             READ MOORING TIMES
C
      WRITE(NPRINT,2108)
 2108 FORMAT(1H1,24HMOORING TIMES IN MINUTES)
      WRITE(NPRINT,2110) (I,I=1,NHTSTP)
      WRITE(NPRINT,1111)
      DO 2120 I=1,NCRFTP
      WRITE(NPRINT,1115) I
      READ(NCARD,5011) (CITIME(J),J=1,NHTSTP)
      WRITE(NPRINT,1117) (CITIME(J),J=1,NHTSTP)
      DO 2119 J=1,NHTSTP
 2119 MOORTM(J,I)= CITIME(J)*60. +.5
 2120 CONTINUE
C
C             READ LOADING DELAY TIMES IN SECONDS.
C
C             READ BARGE DISCHARGE TIME, DECK DELAY TIME,RO TON BOOM RIG
```

```
C          TIME . IN TON ROOM RIG TIME.
      WRITE(NPRINT,1120)
      WRITE(NPRINT,1110)
 1110 FORMAT(1X,'RELOADING DELAY TIMES IN MINUTES--/1X)
      READ(NCARD,5010) (OITIME(I),I=1,8)
      WRITE(NPRINT,1120)  (OITIME(I),I=1,8)
 1120 FORMAT(1X,21HBARGE DISCHARGE TIME=,F8.2/1X,16HDECK DELAY TIME=,F8.
     .2/1X,21H[illegible] TON ROOM RIG TIME=,F8.2/1X,21H115 TON ROOM RIG TIME=,F8.
     .2/1X,15HSHIP MOVE TIME=,F8.2/1X,24HSEA ISLAND MOORING TIME=,F8.2/1
     .X,24HELICOPTER PLATFORM DELAY=,F8.2/1X,15HSHIP WARP TIME=,F8.2)
      [illegible]= OITIME(1)*60. +.5
      [illegible] OITIME(2)*60. +.5
      [illegible] ITIME(3)*60. +.5
      [illegible]= OITIME(4)*60. +.5
      [illegible] =OITIME(5)*60.+.5
      [illegible] =OITIME(6)*60.+.5
      [illegible] =OITIME(7)*60.+.5
      [illegible] = ITIME( )*60.+.5
C
C          READ LOADING TIMES
C
      WRITE (NPRINT,1150)
 1150 FORMAT(1H1,[illegible]LOADING TIMES AT SHIPSIDE IN MINUTES)
      WRITE(NPRINT,2110) (I,I=1,NHTSTP)
      WRITE (NPRINT,1111)
      [illegible] I=1,[illegible]
      WRITE(NPRINT,1115) I
      [illegible] J=1,NTAGTP
      WRITE (NPRINT,11[illegible]) J
      READ (NCARD,5010)     (OITIME(K),K=1,NHTSTP)
      WRITE (NPRINT,1117)( ITIME(K),K=1,NHTSTP)
      [illegible] K=1,NHTSTP
 [illegible] L[illegible]TIM(K,I,J)= OITIME(K)*60. +.5
 [illegible] CONTINUE
 [illegible] CONTINUE
C
C          [illegible] SET-UP TIME
C
      WRITE (NPRINT,1[illegible])
 [illegible] FORMAT([illegible] -SET-UP- TIMES IN MINUTES)
      WRITE(NPRINT,1[illegible])  (I,I=1,[illegible]LUSTP)
 [illegible] FORMAT(1X,[illegible](I -),[illegible]LUS TYPE[illegible],91(1H-)/1X,15I)
      WRITE (NPRINT,1111)
      [illegible]
      [illegible] I=1,L[illegible]
      WRITE(NPRINT,1115) I
      READ (NCARD,5010)     (OITIME(J),J=1,NLUSTP)
      WRITE (NPRINT,1117)(OITIME(J),J=1,NLUSTP)
      [illegible] J=1,NLUSTP
 [illegible] LU[illegible](I,J)= ITIME(J)*60.+.
 [illegible] CONTINUE
C
C          READ LUS SHUTDOWN TIMES.
C
      WRITE (NPRINT,7170)
 7170 FORMAT(1X///1X,[illegible]LUS SHUTDOWN TIMES IN MINUTES)
```



```
      WRITE(NPRINT,[illegible])(I,I=1,[illegible])
      WRITE (NPRINT,1111)
      DO 7200 I=1,L2
      WRITE(NPRINT,1115) I
      READ(NCARD,5010)    (OITIME(J),J=1,NLUSTP)
      WRITE(NPRINT,1117)( ITIME(J),J=1,NLUSTP)
      DO 7190 J=1,NLUSTP
 7190 LUSSDT(I,J)=OITIME(J)*60.+.5
 7200 CONTINUE
C
C          READ CRAFT-TRUCK LOADING TIMES.
C
      L2=NMHETP+2
      WRITE(NPRINT,5210)
 5210 FORMAT(1H1,37HCRAFT-TRUCK LOADING TIMES IN MINUTES)
      WRITE(NPRINT,5220)  (I,I=1,L2)
      WRITE(NPRINT,1111)
      L3=NCRETP+1
      DO 5250 I=1,L3
      WRITE(NPRINT,1115) I
      DO 5240 J=1,NTAGTP
      WRITE(NPRINT,1155) J
      READ(NCARD,5010)      (OITIME(K),K=1,L2)
      WRITE(NPRINT,1117)    (OITIME(K),K=1,L2)
      DO 5230 K=1,L2
 5230 LOCTTM(J,K,I)=OITIME(K)*60.+.5
 5240 CONTINUE
 5250 CONTINUE
C
C          READ CRAFT-GROUND LOADING TIMES.
C
      WRITE(NPRINT,5260)
 5260 FORMAT(1H1,37HCRAFT-GROUND LOADING TIMES IN MINUTES)
      WRITE(NPRINT,5220)  (I,I=1,L2)
      WRITE(NPRINT,1111)
      L3=NCRETP+1
      DO 5290 I=1,L3
      WRITE(NPRINT,1115) I
      DO 5280 J=1,NTAGTP
      WRITE(NPRINT,1155) J
      READ(NCARD,5010)      (OITIME(K),K=1,L2)
      WRITE(NPRINT,1117)    (OITIME(K),K=1,L2)
      DO 5270 K=1,L2
 5270 LOCGTM(J,K,I)=OITIME(K)*60.+.5
 5280 CONTINUE
 5290 CONTINUE
C
C          READ GROUND-TRUCK LOADING TIMES
C
      L2=NMHETP+1
      WRITE(NPRINT,6010)
 6010 FORMAT(1H1,37H GROUND-TRUCK LOADING TIMES IN MINUTES-)
      WRITE(NPRINT,5220)(I,I=1,L2)
      WRITE (NPRINT,1111)
      DO 6040 I=1,NTRKTP
      WRITE(NPRINT,4010)I
```

```
      DO 6040 J=1,NTAGTP
      WRITE(NPRINT,1115)J
      READ(NCARD,8501)(CITIME(K),K=1,L2)
      WRITE(NPRINT,1117)(CITIME(K),K=1,L2)
      DO 6020 K=1,L2
 6020 LDGTIM(J,K,I)=CITIME(K)*60.+.5
 6030 CONTINUE
 6040 CONTINUE
C
C     READ TRUCK-GROUND LOADING TIMES
      WRITE(NPRINT,6050)
 6050 FORMAT(1H1,35HTRUCK-GROUND LOADING TIMES IN MINUTES--)
C
      WRITE(NPRINT,5020)(I,I=1,L2)
      WRITE(NPRINT,1111)
      DO 6080 I=1,NTRKTP
      WRITE(NPRINT,4010)I
      DO 6070 J=1,NTAGTP
      WRITE(NPRINT,1115)J
      READ(NCARD,8501)(CITIME(K),K=1,L2)
      WRITE(NPRINT,1117)(CITIME(K),K=1,L2)
      DO 6060 K=1,L2
 6060 LTGTIM(J,K,I)=CITIME(K)*60.+.5
 6070 CONTINUE
 6080 CONTINUE
C
C          READ CRAFT-CARGO-HATCH SLOT PRIORITY MATRIX.
      WRITE(NPRINT,170)
  170 FORMAT(1H1,34HCRAFT-CARGO-HATCH SLOT PRIORITY MATRIX)
      WRITE(NPRINT,2112)  (I,I=1,NTAGTP)
      WRITE(NPRINT,1111)
      DO 190 I=1,NCRFTP
      WRITE(NPRINT,1115) I
      DO 180 J=1,NHTSTP
      WRITE(NPRINT,172) J
  172 FORMAT(1X,16HHATCH SLOT TYPE=,I3)
      READ(NCARD,8540)  (NPRCHC(I,J,K),K=1,NTAGTP)
      WRITE(NPRINT,8550)(NPRCHC(I,J,K),K=1,NTAGTP)
  180 CONTINUE
  190 CONTINUE
C
C          READ LUS-MHE PRIORITY MATRICES
C
      READ(NCARD,1000)NLUSPR
      WRITE(NPRINT,2190)NLUSPR
 2190 FORMAT(1H1,24HLUS-MHE PRIORITY MATRIX/1X,39HMAX NO. OF COMPATIBLE
     *PRIORITY NUMBERS=,I5)
      WRITE(NPRINT,2112)  (I,I=1,NTAGTP)
      WRITE(NPRINT,1111)
C          LOOP THRU CRAFT TYPES
      DO 2300 I=1,NCRFTP
      WRITE(NPRINT,1115) I
C          LOOP THRU PRIORITY NUMBERS
      DO 2290 J=1,NLUSPR
      WRITE(NPRINT,2201) J
C          READ LUS PRIORITIES
      READ(NCARD,8540)  (NPRLUS(J,I,K),K=1,NTAGTP)
      WRITE(NPRINT,2220)
 2220 FORMAT(1X,11HLUS TYPES--)
      WRITE(NPRINT,8550)(NPRLUS(J,I,K),K=1,NTAGTP)
C          READ MHE PRIORITIES
      READ(NCARD,8540)  (NPRMHE(J,I,K),K=1,NTAGTP)
      WRITE(NPRINT,2230)
 2230 FORMAT(1X,11HMHE TYPES--)
      WRITE(NPRINT,8550)(NPRMHE(J,I,K),K=1,NTAGTP)
 2290 CONTINUE
 2300 CONTINUE
C
C          READ TRUCK PRIORITY MATRIX
C
      WRITE(NPRINT,4000)
 4000 FORMAT(1H1,23HTRUCK PRIORITY MATRIX--)
      WRITE(NPRINT,2112) (I,I=1,NTAGTP)
      WRITE(NPRINT,1111)
      DO 4050 I=1,NTRKTP
      WRITE(NPRINT,4010) I
      READ(NCARD,8540)  (NPRTRK(I,J),J=1,NTAGTP)
 4050 WRITE(NPRINT,8550)(NPRTRK(I,J),J=1,NTAGTP)
C
C     READ MHE PRIORITY MATRIX FOR TRUCKS.
C
      READ(NCARD,1000)NTRKPR
      WRITE(NPRINT,6100)NTRKPR
 6100 FORMAT(1H1,35HMHE PRIORITY MATRIX FOR TRUCKS--/1X,39HMAX NO. OF CO
     *MPATIBLE PRIORITY NUMBERS=,I5)
      WRITE(NPRINT,2112)(I,I=1,NTAGTP)
      WRITE(NPRINT,1111)
      DO 6130 I=1,NTRKTP
      WRITE(NPRINT,4010)I
      DO 6120 J=1,NTRKPR
      WRITE(NPRINT,2201)J
      READ(NCARD,8540)  (MHEPRY(J,I,K),K=1,NTAGTP)
      WRITE(NPRINT,8550)(MHEPRY(J,I,K),K=1,NTAGTP)
 6120 CONTINUE
 6130 CONTINUE
      RETURN
C
C          GENERAL PURPOSE FORMAT STATEMENTS.
C
 1120 FORMAT(1X//1X)
  148 FORMAT(4012)
  150 FORMAT(1X,(4(I3)))
 8540 FORMAT(16I5)
 8550 FORMAT(1X,16I5)
  164 FORMAT(4A4,1X,5I7)
  166 FORMAT(1X,4A4,9X,3I15)
  500 FORMAT(10F8.2)
  501 FORMAT(13F6.2)
 2181 FORMAT(1X/1X)
 2110 FORMAT(1X,26(1H-),16HHATCH SLOT TYPES,84(1H-)/1X,13I9)
 1111 FORMAT(1X,120(1H-))
 1117 FORMAT(1X,13F8.2)
```

FEDATA DATE - 78311 [illegible]

```
1115 FORMAT(1X/1X,11HCRAFT TYPE-,I3)
4110 FORMAT(1X/1X,11HTRUCK TYPE-,I3)
1150 FORMAT(6X,11HCARGO TAG- ,I3)
 201 FORMAT(6X, PRIORITY=,I3)
2112 FORMAT(1X,  (1H-),11HCARGO TAGS-,89(1H-)/1X,16I5)
5120 FORMAT(1X,  (1H-),MHE TYPE,91(1H-)/1X,15I6)
1 [illegible] FORMAT(1 I4)
```

FEDATA DATE - 78311 [illegible]

```
      SUBROUTINE FEDATA
C          READ ALL SCENARIO DATA FROM CARDS.
C
C          READ ALL SCENARIO DATA FROM CARDS.
C
C*****
C
      COMMON/AB1/NCLOCK(100),NEVTYP(100),NOPEL(100),NELEMT(  ),NCODE(20),
     .            NCLKEL,NLSTEL,NTIME,IEVTYP,IELEMT,IACTEL,INTCOM,INTORE,
     .LETIME,LSTIME,NPRINT,NTAPE,NCARD,NTAPE1,NTAPE2,ICOUT,NTAPE3
C
      COMMON/AB2/CARGST(40),CARGVL(40),CARGCT(40),NCARLL(40),NCGTAG(40)
C
      COMMON/AB3/CRAFWT(10),CRAFVL(10),CRAFSP(10,4),CRAFHT(10),NCRAFM(10
     .),MULHAT(10),NCCTIM(10,4 ),[illegible]ILE(10),CRAFCC(10)
C
      COMMON/AB4/TRUKWT(10),TRUKVL(10),TRUKSP(10,2),NTCTIM(10,40),NCRTEK
     .(10,13),NPRTCG(30),MHEPRY(1 ,10,13),MHETRK(40),[illegible](15,15,10),[illegible]
     .TGTM(15,15,10),
     .            KPRCAP,IPRTRK,ITRUCK,NTRUKG,NTRKEL
C
      COMMON/AB5/NESSEL( 5),NCHSHP( 5),IOSHIP( 5),[illegible]( ),[illegible](  ),
     .NCHCON(20),[illegible]CES(20),NHATSS(20),NSTYP(20),NHATNO(  ),[illegible](  ),[illegible]
     .[illegible](20),NSTINE(20),NHATIX(100),NDCH(10 ),NA[illegible](1  ),[illegible]TOTAL(1  ),
     .NHTTAP(100,40),NSSST(5),
     .            ICHCON,LINDEX
C
      COMMON/AB6/NCSTYP(10),NTKTYP(10),NLSTYP(15),NMHTYP(15, ),IDC[illegible](
     .),IDTRUK(30),IDLES(30),IDSDVH(20),
     .            NCAFTP,NCHFTP,NTMATP,NLCSTP,NMHETP,[illegible],[illegible]
     .,NLUS,NSI,NTK TP
C
      COMMON/AB7/DISTC( ),CAPST(5),ACAPST(5),LU[illegible](  ),LO TRK(  ),LO[illegible]
     .(30),LUCL C(15),LUSSTT(15),L[illegible]TM(15,15,10),LOCT[illegible](15,1 ,1 )
C
      COMMON/A13/MCRCUP(30,15),NTKCUM(  ,  ),MHE[illegible]Y(15,3,2),[illegible](15, ,
     .40),MHECUM(15,3, 4),LUSUSE(  ,13),LU[illegible](  , ),[illegible]( , ),[illegible]
     .(20,7),[illegible](20,10),NTRAFF( ),NCRCAP(3 ,40),INDCY( , ),[illegible]TAT(
     .,4,2),CSTAT( ,4,3)
     .,MHEFFS(15,3),MH TOT(15, )
C*****
      INTEGER*2 NEVTYP,      NCFEL ,        NCLEMT,        NC[illegible]          [illegible]
      INTEGER*2 NCCARL,      NCGTA[illegible]                                     [illegible]
      INTEGER*2 NCRAFM,      MULHAT,        NCCTIM,        [illegible]          [illegible]
      INTEGER*2 NTCTIM,      NCRTEK,        N[illegible]TCC,        MHE[illegible]Y       [illegible]
      INTEGER*2 MHETRK,      L[illegible]GTT ,        L[illegible]TM                        [illegible]
      INTEGER*2 NESSEL,      NCHSEL,        IO[illegible]IP,        [illegible]          [illegible]
      INTEGER*2 NCHCON,      NCHCCN,        L[illegible] ,        [illegible]          [illegible]
      INTEGER*2 NSTYP ,      NHATNO,        IDCARG,        [illegible]          [illegible]
      INTEGER*2 NSTINE,      NHATIX,        N[illegible] ,        NACC[illegible]          [illegible]
      INTEGER*2 NTOTAL,      NHTTAP,        NSSST                                 [illegible]
      INTEGER*2 NCSTYP,      NTKTYP,        NLSTYP,        [illegible]TY          [illegible]
      INTEGER*2 IDC[illegible],      IDTRUK,        IDLUS ,        I[illegible]          [illegible]
      INTEGER*2 LUS[illegible],      LUSTRK,        LU[illegible]MHE,        [illegible]          [illegible]
      INTEGER*2 LUSSTT,      LUC[illegible]TM,        LU[illegible]TTM                        [illegible]
      DIMENSION NALFFA( )
```

```
      WRITE(NPRINT,[illegible])
 [illegible] FORMAT(1H1,[illegible] [illegible] DATA--)
C
C     READ CRAFT DATA
C
      WRITE(NPRINT,[illegible])
 [illegible] FORMAT(1X//1X,17HCRAFT IN SYSTEM--/6X,11HCRAFT TYPE,5X,1[illegible]NUMBER O
     *F CRAFT)
      NELEMT(1)[illegible]
      DO 220 I=1,NCRFTP
      READ(NCARD,1000)IPR,NCRTYP(IPR)
      NELEMT(1)=NELEMT(1)+NCRTYP(IPR)
  220 WRITE(NPRINT,1010)IPR,NCRTYP(IPR)
C
C     READ TRUCK DATA
C
      WRITE(NPRINT,222)
  222 FORMAT(1X/1X,1[illegible]TRUCKS IN SYSTEM--/6X,10HTRUCK TYPE,5X,16HNUMBER O
     *F TRUCKS)
      NELEMT(2)=1
      DO 230 I=1,NTRKTP
      READ(NCARD,1000)IPR,NTKTYP(IPR)
      NELEMT(2)=NELEMT(2)+NTKTYP(IPR)
  230 WRITE(NPRINT,1010)IPR,NTKTYP(IPR)
      NCLK[illegible]=NELEMT(1)+NELEMT(2)
C
C     READ LUS DATA
C
      WRITE(NPRINT,2[illegible])
  2[illegible] FORMAT(1X/1X,17HLUS-S IN SYSTEM--/6X,8HLUS TYPE,5X,15HNUMBER OF LU
     *S-S)
      DO 240 I=1,NLUSTP
      READ(NCARD,1000)IPR,NLSTYP(IPR)
  240 WRITE(NPRINT,1010)IPR,NLSTYP(IPR)
C
C     READ MHE DATA
C
      WRITE(NPRINT,242)
  242 FORMAT(1X/1X,16HMHE IN SYSTEM--/6X,8HMHE TYPE,7X,9HTHA POOL,7X,8HT
     *SS POOL,5X,1[illegible] POOL)
      DO 2[illegible] I=1,NMHETP
      READ(NCARD,1000)IPR,(NMHTYP(IPR,J),J=1,NMHEPL)
      WRITE(NPRINT,1010) IPR,(NMHTYP(IPR,J),J=1,NMHEPL)
C               SET THE TOTAL AND INITIAL REQUIREMENT
      DO 2[illegible] J=1,NMHEPL
      [illegible]T[illegible](IPR,J)=NMHTYP(IPR,J)
  24[illegible] MH[illegible](IPR,J)=0
  2[illegible] CONTINUE
C
C     READ SHIP DATA
C
      READ(NCARD,1[illegible])NELEMT(3)
      WRITE(NPRINT,2[illegible])NELEMT(3)
  2[illegible] FORMAT(1H1,2[illegible]NUMBER OF SHIPS IN SYSTEM=,I4)
      WRITE(NPRINT,2[illegible])
  2[illegible] FORMAT(1X,1[illegible]TYPE OF SHIP21X,7HSHIP ID,7X,13HSHIP TYPE NO.,5X,15H[illegible]
```



```
     *[illegible] HATCH SLOT,7X,1[illegible]CARGO HATCHES,5X,1[illegible]ARRIVAL TIME (H[illegible]))
      NELEMT(4)=0
      NCARDT=[illegible]
      L2=NELEMT(3)
      DO 260 I=1,L2
      READ(NCARD,262)(NALPHA(J),J=1,4),ISHIPF(I),NHSSHP(I),NCHSHP(I),
     *ATIME
      WRITE(NPRINT,264)(NALPHA(J),J=1,4),I,ISHIPF(I),NHSSHP(I),NCHSHP(I)
     *,ATIME
      NELEMT(4)=NELEMT(4)+NHSSHP(I)
      NCARDT=NCARDT+NCHSHP(I)
      ISUR=NCLREL+I
      NCLOCK(ISUR)=ATIME*3600.+.5
      IF(NCLOCK(ISUR).LT.1) NCLOCK(ISUR)=1
  260 CONTINUE
  262 FORMAT(4A4,1[illegible],[illegible]I7,F[illegible].2)
  264 FORMAT(1X,4A4,4X,4I20,F20.2)
C
C             WRITE LEGEND FOR SHIP TYPES.
C
      WRITE(NPRINT,2[illegible])
 2[illegible]20 FORMAT(1X/1X,17HSHIP TYPE [illegible]--/3X,23H1-    GENERAL CARGO SHIP/ X
     *,22H2-    SS CONTAINER SHIP/3X,[illegible]H3-    LASH/3X,1[illegible]H4-    [illegible] SHIP/3
     *X,23H5-    NSS CONTAINER SHIP)
C
C     READ HATCH SLOT DATA.
C
      WRITE(NPRINT,266)
  266 FORMAT(1X/6X,1[illegible]HATCH SLOT ID,5X,15HHATCH SLOT TYPE,1[illegible]X,[illegible]SHIP I[illegible],
     *4X,1[illegible]HCARGO HATCH USED,6X,14HHATCH LOCATION)
C     LOOP ON ALL HATCH SLOTS
      L2=NELEMT(4)
      DO 280 I=1,L2
      READ(NCARD,1000)IPR,IHSLT(IPR),NSHPHS(IPR),NCHCOR(IPR),LOCHS(IPR)
  280 WRITE(NPRINT,282)IPR,IHSLT(IPR),NSHPHS(IPR),NCHCOR(IPR),LOCHS(IPR
     *)
  282 FORMAT(1X,5I20)
C
C             WRITE LEGEND FOR HATCH LOCATION
C
      WRITE(NPRINT,2000)
 2000 FORMAT(1X//1X,17HHATCH LOCATION--/4X,[illegible]H1-    NEAR SIDE OF GENERAL
     *  [illegible] SHIP/4X,4[illegible]H2-    NEAR SIDE AND -END- OF GENERAL CARGO SHIP/4
     *X,35H3-    FAR SIDE OF GENERAL CARGO SHIP/4X,4[illegible]H4-    FAR SIDE AND -
     *END- OF GENERAL CARGO SHIP/[illegible]X,13H5-    CAUSEWAY/4X,4[illegible]H6-    EACH DUM
     *MY SLOT, OTHER SEA-GOING SHIPS)
C
C     READ CARGO HATCH DATA.
C
      WRITE(NPRINT,284)
  284 FORMAT(1H1,1[illegible]HCARGO HATCH DATA--//7X,9HINDEX NO.,6X,9HHATCH ID.,[illegible]X
     *,9H [illegible] NO.,[illegible]X,11HACCESS NO.,4X,11HINITIAL ITEMS,[illegible]X,[illegible]NEXT LINE--NO
     *. OF ITEMS/CARGO MODULE)
      IPR=0
      INDEX=1
      L2=NELEMT(3)
```

```
      DO 400 I=1,L
C     LOOK THRU ALL CARGO HATCHES IN EACH SHIP
      WRITE(NPRINT,[illegible])I,NCHSHP(I)
 [illegible]6 FORMAT(1X/1X,11HSHIP NUMBER,I3,5H WITH,I3,15H CARGO HATCHES.)
      L=NCHSHP(I)
      DO 350 J=1,L
C     SET CARGO HATCH NUMBER.
      IER=IER+1
C     READ DATA FOR THIS CARGO HATCH
      READ(NCARD,[illegible])IDCARH(IER),[illegible](IER)
      IROM=IDCARH(IER)
      IF(IROM.EQ.[illegible]) GOTO 2030
      WRITE(NPRINT,[illegible])IER,IDCARH(IER),NSROOM(IER)
 [illegible]8 FORMAT(1X/1X,11HCARGO HATCH,I3,11H, SHIP TYPE,I2,33H, HL ROOM SHAR
     .ED WITH CARGO HATCH,I3)
      GOTO 2050
 2030 WRITE(NPRINT,2040) IER,IDCARH(IER),NSROOM(IER)
 2040 FORMAT(1X/1X,11HCARGO HATCH,I3,11H, SHIP TYPE,I2,10X,I3,25H LEVEL
     .S CAN BE SEARCHED.)
 2050 CONTINUE
C
C     READ HATCH TABLE DATA FOR THIS CARGO HATCH
C
      NSTIER(IER)=INDEX
 289 READ(NCARD,290)MATIX(INDEX),NDCE(INDEX),NACCES(INDEX),N,(NHTTAB(I
     .NDEX,K),K=1,NCARTP)
 290 FORMAT([illegible]I2/[illegible]I3)
C     FIND TOTAL NUMBER OF ITEMS
      NTOTAL(INDEX)=0
      DO 300 K=1,NCARTP
      IF((IDCARH(IER).EQ.2).OR.(IDCARH(IER).EQ.5)) GOTO 298
      NTOTAL(INDEX)=NTOTAL(INDEX)+NHTTAB(INDEX,K)
      GOTO 300
 298 IF(NHTTAB(INDEX,K).[illegible])NTOTAL(INDEX)=NTOTAL(INDEX)+1
 300 CONTINUE
      WRITE(NPRINT,302)INDEX,MATIX(INDEX),NDCE(INDEX),NACCES(INDEX),NTO
     .TAL(INDEX),(NHTTAB(INDEX,K),K=1,NCARTP)
 302 FORMAT(1X,[illegible]/1X,2[illegible]I4/1X,2(I4)
      INDEX=INDEX+1
      IF(N.NE.-1) GOTO 289
 350 CONTINUE
 400 CONTINUE
      LINDEX=INDEX-1
C               READ NUMBER OF *SEA ISLANDS* IN SYSTEM.
      READ(NCARD,1000) NSI
      WRITE(NPRINT,2010) NSI
 2010 FORMAT(1X//1X,22HNUMBER OF SEA ISLANDS=,I5)
C
C     DISTANCES (MILES)
C
      READ(NCARD,500)(DIST(I),I=1,9)
      WRITE(NPRINT,502)(DIST(I),I=1,9)
 [illegible]2 FORMAT(1H1,[illegible]HDISTANCES IN MILES--/1X,14HSHIP-BEACH 0--,F10.2/1X,
     .1[illegible]HSHIP-S 0-SHIP--,F10.2/1X,16HBEACH 0-SHIP-S 0--,F10.2/1X,1[illegible]HBEAC
     .H 0-BEACH--,F10.2/1X,13HBEACH-ISS 0--,F10.2/1X,13HISS-DEPOT 0--,
     .F10.2/1X,11HISS 0-ISS--,F10.2/1X,15HDEPOT 0-DEPOT--,F10.2/1X,
```



```
     .1[illegible]HDEPOT-BEACH--,F10.2)
C
C     CAPACITY OF CARGO STORAGE AREAS
C
      READ(NCARD,[illegible])CAPST(1),CAPST(2)
      WRITE(NPRINT,512)CAPST(1),CAPST(2)
 512 FORMAT(1X//1X,23HMAX. TONS OF CARGO--,F1[illegible].2,11H AT THA AND,F1[illegible].2,[illegible]
     .H AT ISS.)
C
C               OUTPUT TIME INTERVALS
C
      READ(NCARD,[illegible])CTIME,OTIME1
      WRITE(NPRINT,520) CTIME,OTIME1
 520 FORMAT(1X//1X,32HCUMULATIVE OUTPUT TIME INTERVAL-,F8.2,[illegible]H HOURS,
     . PERIODIC OUTPUT TIME INTERVAL-,F8.2)
      IOTCUM=OTIME*3600.
      INTER=OTIME1*3600.
C
C               READ PRODUCTIVITY OUTPUT CHOICE.
C
      READ(NCARD,1000)ICOUT
      WRITE(NPRINT,530)ICOUT
 530 FORMAT(1X/1X,27HPRODUCTIVITY OUTPUT CHOICE-,I3)
      WRITE(NPRINT,540)
 540 FORMAT(2X,1[illegible]HOUTPUT CHOICES--/3X,60H1-   WRITE AT TIME INTERVALS,
     . W/ INDIVIDUAL CRAFT STATISTICS/3X,37H2-   WRITE AT END ONLY, W/ IN
     .D. CRAFT/3X,45H3-   AT INTERVALS W/ NO IND. CRAFT STATISTICS/3X,[illegible]
     .H4-   AT END ONLY, NO IND. CRAFT)
 500 FORMAT(1(F8.2))
 1000 FORMAT(10I8)
 1010 FORMAT(1X,(6I1[illegible]))
      RETURN
      END
```

```
      SUBROUTINE SHOPV
C         SHOP V GENERATION ROUTINE--ASSIGNS A NON CONTAINER SHIP TO A
C         SEA ISLAND AND GENERATES EVENT 14--HATCH SLOT OPENS, FOR
C         [illegible] UPDATE HATCH SLOTS
C
C......
C
      COMMON/ABI1/CLOCK(100),NEVTYP(100),NOPEL(100),NELEMT(6),NCODE(20),
     .           NCLKEL,NLSTEL,MTIME,IEVTYP,IELEMT,IACTEL,INTCUM,INTPER,
     .LPTIME,LPTIN,[illegible]PRINT,NTAPE,NCARD,NTAPE1,NTAPE2,ICOUT,NTAPE3
C
      COMMON/AB5/[illegible]ARST(10),CRAFVL(10),CRAFSP(10,4),CRAFHT(10),NCRAFM(10
     .),MULHAT(10),NCCITM(10,40),NFILE(10),CRAFES(10)
C
      COMMON/AB[illegible]/[illegible]( 5),NCHSHP( 5),IOSHIP( 5),NSHPHS(20),IDHSLT(20),
     .NCHC[illegible]R(20),L[illegible](20),NHATSS(20),[illegible]TYP(20),NHATNO(20),IDCARH(20),NS
     .[illegible](20),NSTI[illegible](20),NHATIX(100),NDCP(100),NACCES(100),NTOTAL(100),
     .[illegible](1[illegible],4[illegible]),NSST(20),
     .           IDHC[illegible]R,LINEEX
C
      COMMON/AB[illegible]/[illegible]TYP(10),NTKTYP(10),NLSTYP(15),NMHTYP(15,3),IDCRAF(30
     .),[illegible](30),[illegible](30),[illegible]SDVH(20),
     .           NCRSTP,NCRETP,NTKTP,NLUSTP,NMHETP,NHTSTP,NCARHT,NMHEPL
     .,NLO[illegible],NSI,[illegible]TA[illegible]IP
C
      COMMON/AB10/[illegible]TM(10,10),LOADTM(10,10,10),
     .N[illegible]T,NDECKI,NRTM[illegible],NETM[illegible],NSMT,NSIMT,NHELOD,NSIWT
C
      COMMON/AB13/N[illegible]RCUM(30,15),NTKCUM(30,9),MHECYC(15,3,2),MHECAR(15,3,
     .40),MHE[illegible](15,3,40),IUSUSE(30,10),IUSCUM(30,2),NSTCUM(2,40),NHSCUM
     .(20,2),[illegible](20,10),NTRAFF(2),NCPCAR(30,40),INDCYC(30,2),KSTAT(30
     .,4,2),[illegible]TAT(30,4,3)
C......
      INTEGER NEVTYP,      NOPEL ,      NELEMT,      NCODE        A1
      INTEGER NCRAF,       MULHAT,      NCCITM,      NFILE        A3
      INTEGER [illegible],  NCHSHP,      IOSHIP,      NSHPHS       A5
      INTEGER [illegible],  NCHC[illegible]R,    LOCHS ,      NHATSS       A5
      INTEGER [illegible]STYP,  NHATNO,      IDCAPH,      NSBOOM       A5
      INTEGER [illegible],  NHATIX,      NDCP  ,      NACCES       A5
      INTEGER NTOTAL,      NHTTAP,      NSSST                     A5
      INTEGER [illegible],  NTKTYP,      NLSTYP,      NMHTYP       A6
      INTEGER [illegible],  IUTRUK,      ICLUS ,      IDSDVH       A6
      INTEGER [illegible],  LOFDTP                                A10
      ITIME=MTIME
      [illegible]
      [illegible]
      [illegible]
      IFLA=[illegible]
C
C         SHIP ARRIVAL EVENT?
C
      IF(IEVTYP.EQ.14) GOTO 100
C         NO SHIP ARRIVAL.  CURRENT SHIP AT SEA ISLAND IS
C         DEPARTING.  FIND WAITING SHIP.
      L[illegible]=NELEMT(2)
      DO 10 I=1,L[illegible]
```

```
C         IS SHIP A NON CONTAINER SHIP WITHOUT A SEA ISLAND?
      I[illegible]=NCLKEL+I
      IF((I[illegible](I).NE.[illegible]).OR.(NEVTYP(I[illegible]).NE. ).OR.(N[illegible]SS(I).NE.0)) GO
     .TO 10
      IF(NCLOCK(I[illegible]).LE.MINTIM) GOTO 10
      ISHIP=I
      MINTIM=NCLOCK(I[illegible])
   10 CONTINUE
C
C         WAITING SHIP FOUND.
C
      IF(ISHIP.EQ.0) GOTO 2000
      GOTO 110
C
C         SHIP ARRIVAL
C
  100 ISHIP=IACTEL
C
C         SEARCH FOR HELICOPTERS IN SYSTEM.
C
  110 MINTIM=[illegible]
      L2=NELEMT(1)
      DO 140 I=1,L2
      ICRTYP=IDCRAF(I)
      IF(NCRAFM(ICRTYP).NE.4) GOTO 140
C
C         HELICOPTER FOUND.  IS IT ASSIGNED TO CURRENT SHIP?
C
      IHELO=I
      IF((NEVTYP(I).NE.2).OR.(NCLOCK(I).LT.MINTIM)) GOTO 140
      IHTS=NOPEL(I)
      IF(NSHPHS(IHTS).NE.ISHIP) GOTO 140
      MINTIM=NCLOCK(I)
      ITIME=NCLOCK(I)
  140 CONTINUE
C
C         MOVE SHIP TO SEA ISLAND.
C
      IF(IEVTYP.EQ.14) GOTO 200
      ITIME=NSMT+ITIME
C         CLOSE HATCH SLOT?
      IF(MINTIM.GT.0) GOTO 200
C         LOOP THROUGH HATCH SLOTS.
      L2=NELEMT(4)
      DO 160 I=1,L2
      IF((NSHPHS(I).NE.ISHIP).OR.(NHATSS(I).NE.4)) GOTO 160
C         CLOSE AN OPEN SLOT.  UPDATE STATISTICS
      ISUB=NCLKEL+NELEMT(3)+I
      NHSCUM(I,2)=NHSCUM(I,2)+MTIME-NCLOCK(ISUB)
      NCLOCK(ISUB)=-MTIME
      NEVTYP(ISUB)=0
      NHATSS(I)=2
      IFLA =1
  160 CONTINUE
C
C         MOOR SEA ISLAND WITH SHIP.
```

```
C
  240 UTIME=ETIME+SSTART
      NSSSI(ISHIP)=NSI
      NSI=NSI-1
      UTIME=UTIME/3600.
      WRITE(NTAPE, 210) ISHIP,NSSSI(ISHIP),UTIME
  210 FORMAT(1X, 4H SHIP,I5,21H  MOVED TO SEA ISLAND,I5,21H  MOORING COMP
     .LETE AT,F8.2, 6H  HOURS.)
C
C             GENERATE HATCH OPEN EVENTS FOR ONE WATER CRAFT SLOT AND
C             ONE HELICOPTER SLOT, IF APPROPRIATE.
C
      L=NSSLEMT(6)
      ICLOT=0
      ILAP=
      DO 250 I=1,L
C             SLOT OF THE PROPER SHIP?
      IF(LSHPRT(I).NE.ISHIP) GOTO 250
      IF(LOCHS(I).NE.2) GOTO 230
      IF(ISLOT.NE.0) GOTO 250
C             SET HATCH OPEN EVENT FOR LOWEST-NUMBERED WATER-CRAFT SLOT.
      ICLKEL=NCLKEL+NELEMT(3)+1
      HCLOCK(ICLKEL)=UTIME
      ISLOT=I
      GOTO 24
C
C             SLOT IS A HELICOPTER TYPE.  SHOULD IT OPEN?
C
  230 IF(LOCHS(I).LT.4) GOTO 245
      IF(IHEL.NE.0) GOTO 300
      IF(ISP.NE.0) GOTO 245
C             FIND SAFETY SPACE BETWEEN HELO AND SEA IS.
      ICAP=LOCHSF(ISHIP)/2+.5
CC            TEST SAFETY SPACE.
      II=NCHOPR(ISLOT)
  235 I2=NCHOPR(I)
      IF((I2-II).LT.ICAP) GOTO 250
C             OKAY OPEN HELO. SLOT.
      ICLKEL=NCLKEL+NELEMT(3)+1
      HCLOCK(ICLKEL)=ITIME
   24 IEVTYP(ICLKEL)=I
      NOPEL(ICLKEL)=
      TIME=HCLOCK(ICLKEL)/3600.
      WRITE(NTAPE, 242) I,UTIME
  242 FORMAT(1X,13HHATCH SLOT,I3,14H  WILL OPEN AT,F8.2, 6H  HOURS.)
      IF(LOCHS(I).NE.8) GOTO 300
      GOTO 25
C
C             WRITE ERROR MESSAGE.
C
  245 WRITE(NPRINT,247) I,ISHIP,LOCHS(I)
  247 FORMAT(1X,15HDATA ERROR-SLOT,I3, 9H  AT SHIP,I3, 9H  LOCHS=,I3)
  250 CONTINUE
C
C             SORT HATCH SLOTS?
C
```



```
  300 IF(DEBUG) CALL HSCHET
  2   RETURN
      END
```

```
      SUBROUTINE START
C
C     STARTUP ROUTINE
C     INITIALIZES CLOCKS, CARGO LOCATIONS, HATCH SLOT STATES, AND LUS
C     STATES. PREPARES SYSTEM FOR PROCESSING OF FIRST EVENT.
C
C*****
C
      COMMON/A01/NCLOCK(100),NEVTYP(100),NOPEL(100),NELEMT(6),NCODE(20),
     .          NCLAEL,NLSTEL,NTIME,IEVTYP,IELEMT,IACTEL,INTCUM,INTPER,
     .LETIME,LSTIME,NPRINT,NTAPE,NCARD,NTAPE1,NTAPE2,ICOUT,NTAPE3
C
      COMMON/A02/CARGWT(40),CARGVL(40),CARGCT(40),NCARHL(40),NCCTAC(40)
C
      COMMON/A03/CRAFWT(10),CRAFVL(10),CRAFSP(10,4),CRAFHT(10),NCRAFM(10
     .),MULHAT(10),NCCITM(10,40),NFILE(10),CRAFFS(10)
C
      COMMON/A04/TRUKWT(10),TRUKVL(10),TRUKSP(10,2),NTCITM(10,40),NPRTRK
     .(10,13),NPSTCG(30),MHEFRY(10,10,13),MHETRK(30),LDGTTM(13,15,10),LD
     .TTTM(13,15,10),
     .          NPECAR,IPRTRK,ITRUCK,NTRUKG,NTRKPR
C
      COMMON/A05/NESSHP( 5),NCHSHP( 5),IDSHIP( 5),NSHHS(20),IDHSLT(20),
     .NCHC R(20),LCCHS(20),NHATSS(20),NSTYP(20),NHATNO(20),IDCARH(20),NS
     .HOMP(20),NSTIN (20),NHATIX(100),NDCH(100),NACCES(100),NTOTAL(100),
     .NHTTAF(10,40),NSSST(5),
     .          ICHCOP,LINDEX
C
      COMMON/A06/NCRTYP(10),NTRTYP(10),NLSTYP(15),NMHTYP(15,3),IDCRAF(30
     .),IDTRUK(30),IDLUS(30),IDSDVH(20),
     .          NCARTP,NCRFTP,NTRKTP,NLUSTP,NMHETP,NHTSTP,NCARHT,NMHEPL
     .,NLUS,NSI,NTACTF
C
      COMMON/A07/DIST( 9),CAPST(3),ACAPST(3),LUSCRF(30),LUSTRK(30),LUSMH
     .E(30),LUSLEC(15),LUSSTT(15),LDCCTM(13,15,10),LDCTTM(13,15,10)
C
      COMMON/A08/LCRCAR(30,40),LTKCAR(30,40),LSTCAR(3,40)
C
      COMMON/A09/LISTCR(30),LISTHS(24),NSOFT(30),NPRCAR(20),NPRCHC(10,10
     .,13),
     .          NLISCR,NLISHS,ISLCT,ICRAFT
C
      COMMON/A10/MCOHTM(10,10),LOADTM(10,10,13),
     .NROT,NDECKF,IRTPRO,NRTMIF,NCMT,NCIMT,FHELOD,FSIWT
C
      COMMON/A11/NCITEM(40),NPLAT(20),
     .          ITIME,LETIME,ISLOT,JHATCH,WEIGHT,VOLUME,L1,L3,CCWT,CCVL
     .          ,INDEX,NCONTR,CCFS,FLOOR
C
      COMMON/A12/LUSQUE(30),NPRCCF(30),NPRLUS(15,10,13),NPRMHE(15,10,13)
     .,LUSLIS(16),LUSETM(10,15),LUSSCT(10,15),
     .          LUSCRG,FLUSPR,LUSCEN
C
      COMMON/A13/NCRCUM(30,15),NTRCUM(30,9),MHECYC(15,3,2),MHECAP(15,3,
     .40),MHECUM(15,3, 4),LUSUSE(30,13),LUSCUM(30,2),NSTCUM(2,40),NHSCUM
     .(20,7),NHSCRF(20,10),NTRAFF(7),NCRCAR(30,40),INDCYC(30,2),KSTAT(30
     .,4),LOSTAT(30,4)
     .,MEHGC(15,3),NCIPT(15,4)
C*****
      INTEGER*2NEVTYP,      NOPEL ,      NELEMT,      NCODE        A1
      INTEGER*2NCLAEL,      NCTA                                   A1
      INTEGER*2NCCHAFM,     MULHAT,      NCCITM,      NFILE        A4
      INTEGER*2NTCITM,      NPRTRK,      MHETRK,      MHEFRY       A4
      INTEGER*2MHETRK,      LDGTTM,      LDTTTM                    A4
      INTEGER*2NESSHP,      NCHSHP,      IDSHIP,      NSHHS        A5
      INTEGER*2IDHSLT,      NCHCOR,      LCCHS,       NHATSS       A5
      INTEGER*2NSTYP ,      NHATNO,      IDCARH,      NSHOMP       A5
      INTEGER*2NSTINT,      NHATIX,      NDCH ,       NACCES       A5
      INTEGER*2NTOTAL,      NHTTAF,      NSSST                     A5
      INTEGER*2NCRTYP,      NTRTYP,      NLSTYP,      NMHTYP       A6
      INTEGER*2IDCRAF,      IDTRUK,      IDLUS ,      IDSDVH       A6
      INTEGER*2LUSCRF,      LUSTRK,      LUSMHE,      LUSLEC       A7
      INTEGER*2LUSSTT,      LDCCTM,      LDCTTM                    A7
      INTEGER*2LCRCAR,      LTKCAR,      LSTCAR                    A8
      INTEGER*2LISTCR,      LISTHS,      NSOFT ,      NPRCAR       A9
      INTEGER*2NPRCHC                                              A9
      INTEGER*2MCOHTM,      LOADTM                                 A10
      INTEGER*2NCITEM,      NPLAT                                  A11
      INTEGER*2LUSQUE,      NPRCCF,      NPRLUS,      NPRMHE       A12
      INTEGER*2LUSLIS,      LUSETM,      LUSSCT                    A12
C
C          SET VALUES FOR NCODE--OUTPUT FORMAT CODE.
C
      NCODE( 1)=19
      NCODE( 2)=21
      NCODE( 3)=39
      NCODE( 4)=51
      NCODE( 5)=22
      NCODE( 6)=59
      NCODE( 7)=72
      NCODE( 8)=80
      NCODE( 9)=81
      NCODE(10)=82
      NCODE(11)=83
      NCODE(12)=84
      NCODE(13)=85
      NCODE(14)=86
      NCODE(15)=43
      NCODE(16)=23
      NCODE(17)=61
C
C          SET STATISTICAL ARRAY TO ZERO.
C
      DO 1 I=1,543
    1 NCRCUM(I,1)=0
C
C        ASSIGN AN ID NUMBER TO EACH CRAFT, FROM ID NUMBERS 1 TO
C          LARGEST CRAFT TYPE.
C          INITIALIZE CRAFT CLOCK AND CRAFT CARGO LOCATIONS.
C
C          SORT CRAFT TYPES ACCORDING TO WT. CAPACITY OF CRAFT.
C
```

```
      DO 5 I=1,NCRFTF
    5 NSORT(I)=I
      IF(NCRFTF.EQ.1) GO TO 11
      L2=NCRFTF-1
      DO 15 I=1,L2
      L1=I+1
      DO 8 J=L1,NCRFTF
      N=NSORT(I)
      M=NSORT(J)
      IF(CRAFNT(N).LT.CRAFNT(M)) GO TO 8
      ITEMP=NSORT(I)
      NSORT(I)=NSORT(J)
      NSORT(J)=ITEMP
    8 CONTINUE
   15 CONTINUE
C              CRAFT TYPES ARE SORTED. ASSIGN ID NUMBERS.
   11 IELEMT=0
      DO 100 I=1,NCRFTF
      ITEMP=NSORT(I)
      IF(NCRTYP(ITEMP).LE.0) GO TO 100
      L2=NCRTYP(ITEMP)
      DO 90 J=1,L2
      IELEMT=IELEMT+1
C              CRAFT ID IS IELEMT, TYPE IS ITEMP
      IDCRAF(IELEMT)=ITEMP
C              PLACE CRAFT IN SHIP'S QUEUE, SET CRAFT SELECTION LIST.
      NCLOCK(IELEMT)=-1
      NEVTYP(IELEMT)=1
      NOPEL(IELEMT)=0
      LISTCF(IELEMT)=IELEMT
C              SET CRAFT CARGO TO ZERO.
      LL=NCARTP+1
      DO 80 K=1,LL
   80 LCRCAR(IELEMT,K)=0
   90 CONTINUE
  100 CONTINUE
      NLISCR=NELEMT(1)
C
C     ASSIGN AN ID NUMBER TO EACH TRUCK.
C     INITIALIZE TRUCK CLOCK AND TRUCK CARGO LOCATION.
C
      IACTFL=0
      DO 200 I=1,NTRKTF
      IF(NTRKTY(I).LE.0) GO TO 200
      L2=NTRKTY(I)
      DO 170 J=1,L2
      IELEMT=IELEMT+1
      IACTFL=IACTFL+1
C     TRUCK ID IS IACTFL, TYPE IS I
      IDTRUK(IACTFL)=I
C     SET CARGO ON TRUCK TO ZERO.
      DO 140 K=1,NCARTP
  140 LTKCAR(IACTFL,K)=0
C
C     PLACE TRUCK IN TRUCK QUEUE AND INITIALIZE CLOCK.
C
```



```
      NCLOCK(IELEMT)=-1
      NEVTYP(IELEMT)=1
      NOPEL(IELEMT)=0
C              INITIALIZE TRUCK MHE ASSIGNMENT.
      MHETRK(IACTFL)=0
  170 CONTINUE
  200 CONTINUE
      NTRUKQ=NELEMT(2)-1
C
C     INITIALIZE SHIP CLOCK.
C
      IELEMT=0
      MTIME=0
      L2=NELEMT(3)
      DO 220 I=1,L2
C     NCLOCK(SHIP ARRIVAL TIMES) WERE READ IN RDATA.
      ISUB=NCLKEL+I
      NEVTYP(ISUB)=14
      NOPEL(ISUB)=0
C              SEA ISLAND NOT ASSIGNED.
      NSSSI(I)=0
C              FIND MINIMUM SHIP ARRIVAL TIME.
      IF(NCLOCK(ISUB).GE.MTIME) GO TO 220
      IELEMT= ISUB
      MTIME=NCLOCK(ISUB)
  220 CONTINUE
C     CHECK FOR A SHIP ARRIVAL AT TIME ZERO.
      IF(MTIME.NE.1) GO TO 1000
C
C     INITIALIZE NCLKEL FOR FIRST SHIP ARRIVAL.
C
      NCLOCK(NCLKEL)=MTIME
      NEVTYP(NCLKEL)=IELEMT-NCLKEL
      NOPEL(NCLKEL)=IELEMT
C
C     INITIALIZE HATCH SLOT CLOCK.
C
      IPR=NCLKEL+NELEMT(3)
      L2=NELEMT(4)
      DO 300 I=1,L2
C     SET CLOCK ELEMENTS TO "NO EVENT GENERATED."
      ISUB=IPR+I
      NCLOCK(ISUB)=-1
      NEVTYP(ISUB)=0
C     BOOM TYPE AS YET UNDETERMINED.
      NOPEL(ISUB)=0
C              HELICOPTER PLATFORM EMPTY.
      NPLAT(I)=0
C     HATCH SLOT STATE IS "NOT ARRIVED."
      NHATMO(I)=0
  300 NHATSS(I)=1
C
C     INITIALIZE SE VEHICLES EVENT CLOCK.
C
      NELEMT(5)=0
      NLSTEL=NCLKEL+NELEMT(3)+NELEMT(4)
```

```
C
C      INITIALIZE STORAGE AREA CAR   .
C
       DO 320 I=1,7
       ACAPCT(I)=0.
       DO 315 J=1,MCAPTF
  315  LSTCAR(I,J)=
  320  CONTINUE
C
C                INITIALIZE LOS QUEUE.
C
       LOSCRG=
       L2=LEMT(I)
       DO 325 I=1,L2
  325  LOSQUE(I)=0
C
C      INITIALIZE STATE OF LOS'S, ASSIGN LOS NUMBERS.
C
       IPR=
       DO 5 I=1,NLOSTP
       IF(NLSTY(I).GT.0) GOTO 460
       LOSLIS(I)=0
       GOTO
  460  LOSLIS(I)=IPR+1
       L2=NLSTY(I)
       DO 475 J=1,L2
       IPR=IPR+1
C      LOS NUMBER IS IPR, TYPE IS I.
       ITLOS(IPR)=I
C      SET LOS STATE TO UNOCCUPIED, NO TRUCK, NO MHE.
       LOSLKF(IPR)=
       LOSTRK(IPR)=
       LOSMHE(IPR)=
  475  CONTINUE
       CONTINUE
       NLOS=IPR
       LOSQN=NLOS
C
C            FIND HIGHEST PRIORITY CARGO MODULE FOR ALL CARGO HATCHES.
C
C            LOOP THRU CARGO HATCHES
       DO    I=1,NCARHT
       LI=  ITINE(I)
       DO 770 INDEX=LI,LINDEX
       IF(NTOTAL(INDEX).EQ.0) GO TO 770
       DO 760 J=1,NCARTF
       IF(NHITAB(INDEX,J).NE.0) GO TO 775
  760  CONTINUE
  770  CONTINUE
C            SET HIGHEST PRIORITY CARGO MODULE DEPENDING ON SHIP TYPE.
  775  NPRCAR(I)=0
       IF(ITOCAR(I).EQ.2)NPRCAR(I)=NHTTAB(INDEX,J)
       IF(ITOCAR(I).EQ.5) NPRCAR(I)=NHTTAB(INDEX,J)
  800  CONTINUE
C      WRITE EVENT CLOCKS AND STATE OF SYSTEM.
       CALL  CLOCK
```



```
       RETURN
C
C      ERROR ROUTINE -- NO SHIP ARRIVAL AT TIME ZERO.
C
 1000  TTIME= MIN  /60.
       WRITE(OUTPAT,1100)
 1100  FORMAT(1X//1X,'ERROR SHIP ARRIVAL AT ZERO TIME.  FIRST SHIP ARRIVES
      . AT TIME=,F1 . ,  HOURS.)
C      WRITE EVENT CLOCKS AND STATE OF SYSTEM.
       CALL  CLOCK
       STOP
       END
```

```
      SUBROUTINE SUMMRY(LETIME)
C
C             SUMMRY SUBROUTINE--UPDATES STATISTICS AT END OF RUN, AND
C             CALCULATES FINAL CRAFT PRODUCTIVITY AND EFFICIENCY.
C
C
      COMMON/A01/NCLOCK(100),NEVTYP(100),NCPEL(100),NELEMT(6),NCODE(20),
     .             NCLKEL,NLSTEL,MTIME,IEVTYP,IELEMT,IACTEL,INTCUM,INTPER,
     .LPTIME,LCTIME,NPRINT,NTAPE,NCARD,NTAPE1,NTAPE2,ICOUT,NTAPE3
C
      COMMON/A13/NCRCUM(30,15),NTKCUM(40,4),MHECYC(15,3,2),MHECAR(15,3,
     .40),MHECUM(15,3, 4),LUSUSE(30,10),LUSCUM(30, ),NSTCUM(2,40),NHSCUM
     .(20,7),NHSERE(20,10),NTRAFF(2),NCRCAR(30,40),INDCYC(30,2),KSTAT(40
     .,4,2),CSTAT(10,4,3)
C*****
      INTEGER*2NEVTYP,       NCPEL ,        NELEMT,       NCODE          A1
      OTIME =LETIME/3600.
      WRITE(NTAPE3,6)  OTIME
    6 FORMAT(1X,20HNORMAL END OF RUN AT,F8.2,6H  HOURS.)
C
C             UPDATE CRAFT AND TRUCK TIMES.
C
      L2=NELEMT(1)
      DO 10 I=1,L2
   10 NCRCUM(I,15)=NCRCUM(I,15)+LETIME+NCLOCK(I)
      L1=NELEMT(2)-1
      DO 20 I=1,L1
      ITUB=I+L2
   20 NTKCUM(I,2)=NTKCUM(I,2)+LETIME+NCLOCK(ISUB)
C
C             IF PRODUCTIVITY STATISTICS ARE NOT PRINTED AT INTERVALS,
C             THEY MUST BE PRINTED HERE.
C
      CALL NCLOCK
      CALL COMPUT(LETIME)
      IF((ICOUT.EQ.2).OR.(ICOUT.EQ.4)) CALL OSTAT(LETIME)
      RETURN
      END
```



```
      SUBROUTINE TKASN (IMELT,IMFILL)
C
C             TRUCK ASSIGNMENT OF TRAZIES--ASSIGNS TRUCK FROM QUEUE TO
C             THA OR ISS, ASSIGNS MHE, LOADS TRUCK, AND GENERATES EVENTS
C             --TRUCK LEAVES TRAZIES. CALL WHEN 1. MHE RETURNED TO POOL.
C             2. TRUCK ARRIVES AT QUEUE. 3. HELICOPTER LEAVES ISS.
C
C*****
C
      COMMON/A01/NCLOCK(100),NEVTYP(100),NCPEL(100),NELEMT(6),NCODE(20),
     .             NCLKEL,NLSTEL,MTIME,IEVTYP,IELEMT,IACTEL,INTCUM,INTPER,
     .LPTIME,LCTIME,NPRINT,NTAPE,NCARD,NTAPE1,NTAPE2,ICOUT,NTAPE3
C
      COMMON/A02/CARGWT(40),CARGVL(40),CARGCT(40),NCARHL(40),NCSTAT(40)
C
      COMMON/A03/CRAFWT(10),CRAFVL(10),CRAFSP(10,4),CRAFHT(10),NCRAFM(10
     .),MULHAT(10),NCCTIM(10,4),NFILE(10),CRAFTS(10)
C
      COMMON/A04/TRUKWT(13),TRUKVL(13),TRUKSP(13,2),NTCITM(10,40),NPRTKR
     .(10,13),NPRTCS(30),MHEPRY(10,10,13),MHETRK(30),LIGTTY(13,15,10),LI
     .TGTM(13,15,10),
     .            NPRCAR,IPRTRK,ITRUCK,NTRUFG,NTRKER
C
      COMMON/A05/NESSHP( ),NCHSHP( ),IPSHIP( ),NSHHS(20),IHOLD(20),
     .NCHCER(20),LICHS(20),NHATSS(20),NSTYP(20),NHATNO(20),ICCARH(20),
     .ROOM(20),NSTIME(20),NHATIX(100),LOCH(100),IACCES(100),NTOTAL(100),
     .NHITAB(100,40),NSSSI(5),
     .            ICHCJR,LINDEX
C
      COMMON/A06/NCRTYP(10),NTKTYP(10),NLSTYP(10),NMHTYP(10,3),IDCRAF(30
     .),IDTRUK(30),IDLUS(30),IDSDVP(20),
     .            NCARTP,NCRFTP,NTRKTP,NLUSTP,NMHETP,NHTSTP,NLASHT,NMHEPL
     .,NLUS,NSI,NTASTP
C
      COMMON/A07/DIST( ),CAPST(3),ACALST(3),LUSCRE( ),LUSTSK( ),LUSMH
     .E(30),LUSLOC(15),LUSSTT(15),LOCCTM(13,15,10),LECTIM(13,15,10)
C
      COMMON/A08/LCRCAR(30,40),LTKCAR(40,4 ),LSTCAR(3,40)
C
      COMMON/A09/LISTCR(30),LISTHS(24),NCOFT( ),NRCAF(20),NRNHC(10,10
     .,13),
     .            NLISCR,NLISHS,ISLOT,ICRAFT
C
      COMMON/A10/NSORTM(10,10),LOFTM(10,1 ,1 ),
     .NOUT,NOUCKT,NRTMJ,NPTMIN,NCNT,NSIMT,NHELAP,NCIWT
C
      COMMON/A11/NCTTEM(40),NPLAT(20),
     .            ITIME,LDTIME,JSLOT,JHATCH,WEIGHT,VOLUME,I1,I2,COST,COST
     .            ,INDEX,NCONTR,CCF ,FLOOR
C
      COMMON/A12/LUSCUR(30),NLCC (30),NPRLUS(15,10,12),NPRMHE(15,1 ,1 )
     .,LUSLIS(15),LUSRTM(10,15),LUSST(10,15),
     .            LUSCR ,NLUSPN,LUSOPN
C
      COMMON/A13/NCRCUM(30,15),NTKCUM(30,4),MHECYC(15,3,2),MHECAR(15,3,
     .40),MHECUM(15,3, 4),LUSUSE(30,10),LUSCUM(30,2),NSTCUM(2,40),NHSCUM
```

```
     *(20,7),NPS(NF(2),10),NTRAFF(2),NCRCAR(50,40),INVTYC(10,2),KSTAT(6
     *,4,2),CSTAT(3,4,5)
C*****
      INTEGER*2NEVTYP,     NFEL ,       NELEMT,      NCODE              A1
      INTEGER*2NCAPEL,     NCGTAG                                       A2
      INTEGER*2NCHAFM,     MOLHAT,      NCLITM,      NFILL              A3
      INTEGER*2NTCLIM,     NPRTRK,      NPRTCG,      MHEPRY             A4
      INTEGER*2MHETRK,     LEGITM,      LDIGIM                          A4
      INTEGER*2NESHP,      NCHSFT,      IDSHIP,      NSHPHS             A5
      INTEGER* IDHSLT,     NCHCTR,      LOCHS ,      NHATSS             A5
      INTEGER*2NSTYP ,     NHATNO,      IDCAFN,      NSROOM             A6
      INTEGER*2NSTING,     NHATIX,      NDCK ,       NACCES             A6
      INTEGER*2NTOTAL,     NRTTAP,      NSSST                           A6
      INTEGER*2NCRTYL,     NTKTYP,      NLSTYP,      NMHTYP             A6
      INTEGER*2IICPAR,     IDTRUK,      IDLUS ,      IDSDVH             A6
      INTEGER*2LLUSRF,     LUSTRK,      LUSMHE,      LUSLOC             A7
      INTEGER*2LUSSIT,     LOCCTM,      LOCTIM                          A7
      INTEGER*2LCHCAR,     LTKCAR,      LSTCAR                          A8
      INTEGER*2LISTCK,     LISTCS,      NSORT ,      NPPCAR             A9
      INTEGER*2NERCIC                                                   A9
      INTEGER*2MCURTM,     LOADTM                                       A11
      INTEGER*2NCITEM,     NELAT                                        A11
      INTEGER*2LUS UE,     NERCCC,      NPRLUS,      NPRMHE             A12
      INTEGER*2LUSLIS,     LUSRTM,      LUSSET                          A12
C
C          RETURN IF NO TRUCKS AVAILABLE
C
      IF(NTRUKG.EQ.0) GO TO 1000
C
C          FIND STORAGE AREA TO SEARCH.
C
      JMHEPL=IMHEPL
      IF(IMHEPL.EQ.3) GO TO 1000
      IF(IMHEPL.EQ.0)JMHEPL=1
C
C          LOOP THROUGH CARGO TYPES.
C
   10 DO 800 I=1,NCARTF
C
C          THIS CARGO AT THIS STORAGE AREA?
C
      IF(LSTCAR(JMHEPL,I).EQ.0) GO TO 800
C
C          SELECT BEST TRUCK FOR THIS CARGO TYPE.
C
      KPRCAR=I
      CALL TRKSEL
C
C          TRUCK FOUND?
C
      IF(ITRUCK.EQ.0) GO TO 800
      ITKTYP=IDTRUK(ITRUCK)
C
C          IS APPROPRIATE MHE AVAILABLE?
C
      ITASTP=NCSTA (I)
```



```
      DO 40 J=1,NTKMHE
      JMHETP=MHEPRY(J,ITKTYP,ITASTP)
      IF(JMHETP.GT.NMHETP) GO TO
      IF(JMHETP.EQ.0) GO TO 800
      IF(NMHTYP(JMHETP,JMHEPL).GT.0) GO TO 900
   40 CONTINUE
  800 CONTINUE
C
C          SEARCH BOTH STORAGE AREAS?
C
      IF(IMHEPL.NE.0) GO TO 1000
      IF(JMHEPL.EQ.2) GO TO 1000
      JMHEPL=2
      GO TO 10
C
C          TRUCK AND MHE HAVE BEEN FOUND.
C
C          UPDATE STATISTICS
C
  900 NTRUKG=NTRUKG-1
      ISUB=ITRUCK+NELEMT(1)
      ITEMP=NTKCUM(ITRUCK,1)+1
      JTEMP=MTIME+NCLOCK(ISUB)
      NTKCUM(ITRUCK,2)=NTKCUM(ITRUCK,2)+JTEMP
      WRITE(NTAPE2,1010)NCODE( ),ITEMP,ITRUCK,MTIME,JTEMP
C
C          ASSIGN MHE.
C
      IF(JMHETP.GT.NMHETF) GO TO 920
      MHETRK(ITRUCK)=JMHETP
      NMHTYP(JMHETP,JMHEPL)=NMHTYP(JMHETP,JMHEPL)-1
      GO TO 930
  920 MHETRK(ITRUCK)=0
C
C          LOAD TRUCK--GROUND-TRUCK.
C
  930 ITRK=ITRUCK
      NOPEL(ISUB)=JMHEPL
      NEVTYP(ISUB)=7
      WRITE(NTAPE,940)ITRK,JMHEPL,KPRCAR,MHETRK(ITRUCK)
  940 FORMAT(1X,5HTRUCK,I4,13H  ASSIGNED TO AREA,I4,16H  FOR CARGO TYPE,
     *I4,20H  WITH MOBILE MHE TYPE,I4)
      CALL TKLOAT(KPRCAR,ITRK,LTIME)
C
C          GENERATE EVENT 7-TRUCK LEAVES THRAISS AND UPDATE STATISTICS.
C
      NCLOCK(ISUB)=MTIME+LTIME
      NTKCUM(ITRUCK,3)=NTKCUM(ITRUCK,3)+LTIME
      JTEMP=MTIME+LTIME
      KTEMP=-JMHEPL
      WRITE(NTAPE2,1010)NCODE(7),ITEMP,ITRUCK,JTEMP,KTEMP,LTIME
      WRITE(NTAPE2,1020)(LTKCAR(ITRUCK,I),I=1,NCARTF)
      GTIME=LTIME/3600.
      WRITE(NTAPE,950)GTIME,(LTKCAR(ITRK,I),I=1,NCARTF)
  950 FORMAT(1X,13HLOADING TAKES,F6.2,26H  HOURS.  TRUCK CARGO IS--/1X,4
     *0I2)
```

```
1000 RETURN
1010 FORMAT(1X,I9,1117)
1020 FORMAT(1X,I1,5 I?)
     END
```



```
      SUBROUTINE TRKAR?(IPR???)
C
C           TRUCK DESTINATION--DETERMINES DESTINATION OF A TRUCK
C           LEAVING THE BEACH ? TO ISS, GENERATES A TRUCK ARRIVES AT
C           ISS/FOR TM EVENT.
C
C*****
C
      COMMON/A01/EL?K(100),EVTYP(100),NOPEL(100),NELEMT(6),NCO??(20),
     .          NCLREL,NESTEL,MTIME,IEVTYP,I?LENT,IACTEL,I?TC?M,I?TP??,
     .LPTIME,L?TIME,NPRINT,NTAPE,NCARD,NTAPE1,NTAPE2,IOOUT,NTAPE3
C
      COMM?N/A03/CARC?T(40),CARSVE(4 ),CARCCT(40),LCAPEL(40),SCGTAC(40)
C
      COMMON/A05/CRAFWT(10),CRAFVL(10),CRAFSP(10,4),CRAFNT(10),NCRAFN(10
     .),MULTAT(10),NCCITM(10,40),F?ILE(10),CRAFTS(10)
C
      COMMON/A04/TRUKWT(10),TRUKVL(10),TRUKSP(10,2),NTCITM(10,40),?PRTRK
     .(10,13),NPRT?C(30),MPEPRY(1?,10,13),MHFTRK(30),LDSTIM(1?,15,1?),L?
     .TCTM(13,15,1?),
     .          ?PRCAR,IPRTRK,ITRUCK,NTRUKS,NT?KEE
C
      COMMON/A06/NCRTYP(10),NTKTYP(10),NESTYP(1?),NMHTYP(1?,?),IDCRAF(?0
     .),IDTRUK(30),I?LUS(30),IE?DS?(?0),
     .          NCARTP,NCEETP,NTRKTP,NLUSTP,NMEETP,NESTP,NCAR?T,?MHEEL
     .,NLUS,NSI,NT??T?
C
      COMMON/A12/DIST( ?),CAPST(3),ACAPST(3),LUSCRE(30),LUSTRK(30),LUSMH
     .F(30),LUSLOC(15),LUSSTT(15),LDCSTM(1?,15,10),LDCTTM(13,1 ,10)
C
      COMMON/A08/LCRCAR(30,40),LTKCAR(?0,40),LSTCAR(?,4))
C
      COMMON/A13/NCRCUM(30,15),NTKCUM(?0,?),MHE?YC(1?,?,2),?HECAR(1?,?,
     .40),MHECUM(1?,?, 4),LUSUSE(?,10),LUSCUM(?6,?),?STCUM(2,40),?HSCUM
     .(20,7),NLSCRE(2?,10),NTRAFF(?),NCRCAR(30,40),I?LCYC(?0,2),K?TAT(?0
     .,4,2),CSTAT(?0,4,?)
C*****
      INTEGER*2NEVTYP,        NOPEL ,        NELEMT,        NCO??         A1
      INTEGER*2NCARHL,        NCCTA,                                      A2
      INTEGER*2NCRAFN,        MULHAT,        NCCITM,        NFILE         A3
      INTEGER*2NTCITM,        NPRTRK,        NT?TCG,        MHFLEY        A4
      INTEGER*2MHFTRK,        LDSTIM,        LDCTCTM                      A4
      INTEGER*2NCRTYP,        NTKTYP,        NESTYP,        NMHTYP        A6
      INTEGER*2IDCRAF,        IDTRUK,        IDLUS ,        IDSLVH        A6
      INTEGER*2LUSCRE,        LUSTRK,        LUSMHF,        LUSLOC        A7
      INTEGER*2LUSSTT,        LDCGTM,        LDCTTM                       A7
      INTEGER*2LCRCAR,        LTKCAR,        LSTCAR                       A9
      ISUB=ITRUCK+NELEMT(1)
      ITKTYP=IDTRUK(ITRUCK)
      DIS=0
C
C           FIND HIGHEST PRIORITY CARGO TYPE OF TRUCK.
C
      DO 20 I=1,NCARTP
      IF(LTKCAR(ITRUCK,I).GT.0) GO TO 40
   20 CONTINUE
```

```
      WRITE(NTAPE,40)ITRUCK,ISHED
   40 FORMAT(1X,17HREFT. TRAVE--TRUCK,I4,                              14H AT LOC
     .ATION,I4,32H IS EMPTY. SENT TO TRUCK SQUAD.)
      NCLOCK(ISUB) MTIME
      NEVTYP(ISUB) 1?
      NOPEL(ISUB)
      GO TO 1 0
   40 NERTO(ITRUCK)-1
C
C     IS TRUCK AT ISS?
C
      IF(IMPEPL.EQ.3) GO TO 1 1
      IF(IMPEPL.EQ.4)DIS=DIS+DIST(6)
C
C              SEND TRUCK TO DEPOT FOR UNLOADING.
C
C              REACH-ISS DISTANCE
  100 DIS=DIST(5)+DIST(7)
C              ISS-DEPOT DISTANCES
  110 DIS=DIS+DIST(6)+DIST(8)
      NOPEL(ISUB)=5
C
C              FIND TRAVEL + ARRIVAL TIME
C
  120 ITIME=60.0*DIS/TRKSPD(ITKTYP,2)+.5
      NTRCUM(ITRUCK,2)=NTRCUM(ITRUCK,2)+ITIME
      NCLOCK(ISUB)=MTIME+ITIME
      NTRAFF(1)=NTRAFF(1)+1
      OTIME=NCLOCK(ISUB)/60.
      NEVTYP(ISUB)=2
      ISUB1=NTRCUM(ITRUCK,1)+1
      WRITE(NTAPE2,1010)FCODE(7),ISUB1,ITRUCK,MTIME,IMPEPL,NOPEL(ISUB),I
     .TIME
      WRITE(NTAPE,130)ITRUCK,IMPEPL,NOPEL(ISUB),OTIME
  130 FORMAT(1X,5HTRUCK,I4,17H MOVES FROM AREA,I4,9H TO AREA,I4,15H
     .TO ARRIVE AT,F8.2,6H HOURS.)
 1010 FORMAT(1X,12,11I7)
 1006 RETURN
      END
```



```
      SUBROUTINE TRL [illegible](IOPRT [illegible],LTIME)
C
C              ROUTE-TRUCK LOADING ROUTINE--LOADS TRUCK, ACCORDING TO
C              INPUT PARAMETERS, WITH CARGO IN A STORAGE AREA.  CALLED
C              BY TRKA[illegible].
C
C*****
C
      COMMON/A01/NCLOCK(1  ),NEVTYP(1   ),NOPEL(150),ELEMT(  ),[illegible](20),
     .                NCLPEL,NCSTYL,MTIME,IEVTYP,IELEMT,IACTEL,INTCNX,INTRRK,
     .LPTIME,LSTIME,[illegible]T,NTAPE,[illegible],NTAPE1, TAPE2,ICOUT,NTAPE3
C
      COMMON/A02/CARCWT(40),CARCVL(40),CARCCT(4 ),NCARPL(40),[illegible]STA (40)
C
      COMMON/A03/CRAFWT(10),CRAFVL(10),CRAFSP(1 ,4),CRAFHT(10),NCRAFM(10
     .),MULHAT(1 ),NCCITM(10,40),[illegible]ILE(10),CRAFES(10)
C
      COMMON/A04/TRUKWT(10),TRUKVL(10),TRUKSP(10,2),NTCITM(10,40),[illegible]PRTRK
     .(10,13),[illegible]RTCC(30),PREPRY(1 ,10,13),MUFTRK(30),LEGITM(1 ,1 ,1 ),[illegible]
     .T TM(13,15,1 ),
     .            NPECAR,IPRTRK,ITRUCK,ITRUKQ,NTRKER
C
      COMMON/A05/[illegible]( 5),NCRSHP( 5),IPSHIP( 5),[illegible]( ),I[illegible](2 ),
     .NCHCOR(20),L[illegible]CRS(20),NHATCS(20),[illegible]STYP(20),[illegible]EATP ( ),IDCAR[illegible]( ),[illegible]
     .[illegible]( 0),NSTIN (20),MHATIX(10 ),IDCB(100),[illegible]( ),[illegible]TAL(100),
     .NHITAB(100,40),NSSSI( ),
     .            ICHCOP,LINDEX
C
      COMMON/A06/NCRTYP(1 ),NTRTYP(10),NLSTYP(1 ),NMETYP(1 ,3),I[illegible]
     .),IDTRUK(30),I[illegible](30),I[illegible]DV[illegible]( 0),
     .                NCARTP,NCREFTP,NT[illegible]TP,NLUSTP,N[illegible]TP,N[illegible]TP,NCA[illegible]T,[illegible]
     ..NLUS ,N 1,NTASTP
C
      COMMON/A07/DIST( 5),CAPST(3),ACAPST(3),[illegible]( ),[illegible]( ),[illegible]
     .F(30),LUSLCC(1 ),LUSSTT(1 ),[illegible]TM(1 ,1 ,10),[illegible]TT (1 ,1 ,1 )
C
      COMMON/A08/LCRCAR(30,40),LIFCAR(30,40),LSTCAR(3,4 )
C
      COMMON/A09/LISTCR(30),LISTHS(24),NSORT(30),[illegible]( ),[illegible](1 ,1
     .,13),
     .            NLISCR,NLISHS,ISECT,ICRAFT
C
      COMMON/A10/MLO TM(10,10),LOALTM(10,10,13),
     .NPDT,[illegible],NRTMEJ,NRTMI ,N MT,NSINT,NHELDI,NSIWT
C
      COMMON/A11/NCITEM(40),NPLAT(20),
     .            ITIME,LDTIME,JSL T,JHATCH,WEIGHT,VOLUME,L1,L ,C ,[illegible]
     .            ,INDEX,NCONTP,CCF ,FLOOR
C
      COMMON/A12/L[illegible](30),NF[illegible]( 3 ),NPRLUS(1 ,1 ,1 ),N[illegible](1 ,1 ,1 )
     .,LUSLT (1 ),LUSETM(10,15),LUSSFT(10,1 ),
     .            LISCRG,NLUSPR,LU[illegible]
C
      COMMON/A13/ CRCUM(30,15),NTKCUM(30,9),MHECYC(1 ,3,2),MHE[illegible](1 ,
     .42),MHECUM(1 ,3, 4),LUSU[illegible](3 ,1 ),LUSCUM(30,2),[illegible]CUM(2,4 ),[illegible]
     .(20,7),[illegible]SCNF(20,10),NTRAFF( ),NCRCAR(30,40),I[illegible]CYC(30, ),[illegible]TAT( 
```

```
     ..4,2),CSTATE(2,4,5)
C.....
      INTEGER*2NEVTYP,    NTPEL ,    NELEMT,    NCOMP          A1
      INTEGER*2NCAPHL,    NCGTAR                               A
      INTEGER*2NCOAFM,    MELHAT,    NCCITM,    NEILF          A4
      INTEGER*2NTCITM,    NPRTHR,    NFSTCC,    MHLFRY         A4
      INTEGER*2MHETRM,    LISTIT,    LOTTIM                    A4
      INTEGER*2NESHP,     NCOSHF,    IOSHIF,    NSHPHS         A
      INTEGER*2IEPELT,    NCHCFS,    LOCHS ,    NHATSS         A
      INTEGER*2NSTYP ,    NHATHS,    IDCAFF,    NSTOGM         A
      INTEGER*2NSTIDB,    NHATIX,    MDOR ,     NACCES         A
      INTEGER*2NTOTAL,    NHTTAF,    NSSSI                     A
      INTEGER*2NORTYP,    NTKEYE,    NESTYF,    NMHTYP         A
      INTEGER*2ITCFAF,    IPTRLK,    IDLUS ,    IOSDVH         A
      INTEGER*2LUSCPF,    LUSTAK,    LUSMHF,    LUSLOC         A7
      INTEGER*2LUSTT,     LPCGTM,    LDSTTM                    A7
      INTEGER*2LCHCAR,    LTKCAL,    LSTCAR                    A8
      INTEGER*2LISTCF,    LISTHS,    NSORT ,    NPRCAP         A9
      INTEGER*2[illegible]                                     A9
      INTEGER*2ML[illegible]TM,  LOADIM                        A10
      INTEGER*2NCITEM,    NELAT                                A11
      INTEGER*2LUSCUE,    NPRCCC,    NPRLUS,    NPRMHE         A12
      INTEGER*2LUSLES,    LUSPTM,    LUSSET                    A12
      ISH=SELEMT(I)+ITRK
      IMHFL=[illegible](ISH)
      IMHETP=MHETRK(ITRK)
      ITKTYP=ITTYPK(ITRK)
      NITEMS=0
      CTWT=0.
      CTVL=0.
      LTIME=0
C
C          LOOP THROUGH CARGO AT STORAGE AREA.
C
      DO [illegible] I=ICARTP,NCARTP
C
C          ANY ITEMS OF THIS TYPE STORED AT THIS AREA?
C
      IF(LSTCAR(IMHFEL,I).EQ.0) GO TO 800
      N1=LSTCAR(IMHFEL,I)
C
C          FIND NUMBER OF ITEMS OF THIS TYPE THAT CAN STILL BE LOADED.
C
      IF(NTCITM(ITMTYP,I).LT.0) GO TO 10
      N2=NTCITM(ITMTYP,I)-NITEMS
      IF(N2.LE.0) GO TO 800
      GO TO 20
   10 N2=1
C
C          FIND NUMBER OF ITEMS ALLOWED DUE TO WEIGHT.
C
   20 N3=(TRUKWT(ITKTYP)-CTWT)/CARGWT(I)
C
C          FIND NUMBER OF ITEMS ALLOWED DUE TO VOLUME.
C
      N4=(TRUKVL(ITKTYP)-CTVL)/CARGVL(I)
```



```
C
C          NUMBER OF LOADABLE ITEMS IS MINIMUM OF THE ABOVE FOUR
C          MEASURES.
C
      NUMBER=MIN0(N1,N2,N3,N4)
      IF(NUMBER.LE.0) GO TO 800
C
C          LOAD CARGO, UPDATE CARGO LOCATIONS.
C
      LSTCAR(IMHFEL,I)=LSTCAR(IMHFEL,I)-NUMBER
      LTKCAR(ITRK,I)=NUMBER
      NITEMS=NITEMS+NUMBER
      CTWT=CTWT+CARGWT(I)*NUMBER
      CTVL=CTVL+CARGVL(I)*NUMBER
      IF(NPRTCG(ITRK).EQ.0)NPRTCG(ITRK)=1
C
C          DETERMINE LOAD TIME
C
      IF(IMHETP.EQ.0)IMHETP=NMHETP+1
      ITACTP=NCSTAT(I)
      LTIME=LDSTIM(ITACTP,IMHETP,ITKTYP)*NUMBER+LTIME
  800 CONTINUE
      RETURN
      END
```

```
      SUBROUTINE TRKSEL
C
C           TRUCK SELECTION FOR CARGO---SELECTS THE BEST TRUCK FROM TRUCK
C           QUEUE FOR A GIVEN CARGO TYPE. CARGO TYPE IS PASSED IN
C           COMMON IN KEYCAR. TRUCK ID IS OUTPUT IN ITRUCK.
C
C*****
C
      COMMON/A1/NCLOCK(1[illegible]),NEVTYP(1[illegible]),NOPEL(1[illegible]),NELE[illegible](6),NCODE(20),
     .       [illegible]EL,NESTEL,NTIME,IEVTYP,IFLEMT,IACTEL,INTCUM,INTPEE,
     .L[illegible]TIM,L[illegible]TIM,[illegible]PRINT,NTAPE,NCARD,NTAPE1,NTAPE2,ICOUT,NTAPE3
C
      COMMON/A2/[illegible]T(40),CARGVL(40),CARGCT(40),NCARPL(40),NCGTAC(40)
C
      COMMON/A4/[illegible]T(10),TRUKVL(10),TRUKSP(10,2),NTCITM(10,40),NPRTRK
     .(10,15),[illegible](50),MHEPRY(10,10,13),MHETRK(30),LEGTIM(15,15,10),LP
     .T[illegible](15,15,10),
     .       KEYCAR,IFRTRK,ITRUCK,NTRUKQ,NTSKEF
      COMMON/A5/[illegible]SHP( 5),NCRSHP( 5),ICSHIP( 5),NSHPHS(20),ICHSLT(20),
     .N[illegible](20),L[illegible]CHS(20),NHATSS(20),[illegible]STYP(20),PHATNO(20),IDCAPH(20),NS
     .[illegible](20),NSTIN[illegible](20),NHATIX(100),NOCP(100),NACCES(100),NTOTAL(100),
     .[illegible](10,40),NSSSI(5),
     .       IDHCMP,LINDEX
C
      COMMON/A6/[illegible]TYP(10),NTKTYP(10),NLSTYP(15),NMHTYP(15,3),IDCRAF(30
     .),I[illegible]TRUK(30),I[illegible](30),I[illegible](20),
     .       [illegible]TP,N[illegible]TP,NTFKTP,NLUSTP,NMHETP,NHTSTP,NCARHT,NMHEPL
     .,NLU[illegible],N[illegible],NTA[illegible]
C*****
      INTEGER*4 NEVTYP,        NOPEL,        NELEMT,       NCODE         A1
      INTEGER*4 NCARPL,        NCGTAC                                     A2
      INTEGER*4 NTCITM,        NPRTRK,       NPRTCG,       MHEPRY        A4
      INTEGER*4 [illegible],        LEGTIM,       LPTGTM                       A4
      INTEGER*4 [illegible],        NCHSHP,       ICSHIP,       NSHPHS        A5
      INTEGER*4 [illegible],        NCHCPR,       LOCHS ,       NHATSS        A5
      INTEGER*4 [illegible],        NPATNO,       IDCAPH,       NSPOOM        A5
      INTEGER*4 [illegible],        NHATIX,       NOCP ,        NACCES        A5
      INTEGER*4 NTOTAL,        NHITAL,       NSSSI                       A5
      INTEGER*4 [illegible],        NTKTYP,       NLSTYP,       NMHTYP        A6
      INTEGER*4 [illegible],        IDTRUK,       IDLUS ,       IDSGVH        A6
      ITRUCK
      [illegible]
C
C           IS CARGO TYPE AN SP VEHICLE?
C
      IF(NCARPL(KEYCAR).GT..1) GO TO 1000
C
C           IS TRUCK QUEUE EMPTY?
C
      IF(NTRUKQ.EQ.0) GO TO 1000
C
C           LOOK THRU TRUCK CLOCK
C
      L[illegible]=NELEMT(5)-1
      DO 200 I=1,L[illegible]
      JELEMT=I+NELEMT(1)
C
C           IS TRUCK IN QUEUE?
C
      IF(NCL[illegible]CK(JELEMT).[illegible]) .AND. [illegible](JELEMT).EQ.1)) [illegible]
C
C           [illegible] COMPARE [illegible] PRIORITY.
C
      IT[illegible]ID=IDTRUK(I)
      ITA[illegible]TP=[illegible](KEYCAR)
      J[illegible]TRK=[illegible](ITRKID,IT[illegible])
      IF(J[illegible]TRK.EQ.0) GO TO [illegible]
      IF(NTCITM(IT[illegible]TP,KEYCAR).[illegible]) GO TO [illegible]
      IF(I[illegible]TRK.EQ.0) GO TO [illegible]
      IF(J[illegible]TRK-I[illegible]) [illegible],100,[illegible]
C
C           SET NEW PRIORITY
C
   50 IPRT[illegible]=J[illegible]TRK
      GO TO 110
C
C           IF TRUCK PRIORITY IS EQUAL TO CURRENT BEST, TEST TRUCK
C           QUEUE ARRIVAL TIMES.
C
  100 IF(NCLOCK(ISUB1).LE.NCLOCK(JELEMT)) GO TO [illegible]
C
C           SET NEW TRUCK ID.
C
  110 ITRUCK=I
      ISUB1=ITRUCK+NELEMT(1)
  200 CONTINUE
 1000 RETURN
      END
```

```
      SUBROUTINE TRUNL(ITRK,LTIME)
C
C         TRUCK UNLOADING SUBROUTINE-- UNLOADS TRUCK AT ITS
C         DEPOT. ACCEPTABLE MHE IS ASSIGNED BEFORE SUBROUTINE IS
C         CALLED.
C
C*****
      COMMON /A1/ ...,NELEMT(6),NCODE(20),
     .      ...,INTCUM,ISTOPF,
     .LETIME,...,ICOUT,NTAPE3
C
      COMMON /A2/ ...,NCARHL(40),NCCTAR(40)
C
      COMMON /A4/ ...,TRUKSF(10,2),NTLTTM(10,40),...
     .(10,15),...,MHEPRY(10,10,15),...,LEGITM(15,15,10),LD
     .I...(15,15,10),
     .      ...,ITRUCK,NTRUKS,NTRKER
C
      COMMON /A6/ ...(10),NESTYP(15),NMHTYP(15,3),IDCRAF(30
     .),I...(...),IDLUS(...),IDSDVH(20),
     .      ...,NMHETP,NHTSTP,NCARHT,NMHEPL
     ....
C
      COMMON /A8/ ...,LTKCAR(30,40),LSTCAR(3,40)
C*****
      INTEGER ...,     ...,        NELEMT,     NCODE       A1
      INTEGER ...,     NCGTAC                              A2
      INTEGER ...,     NEPTRK,     NPRTCC,     MHEPRY      A4
      INTEGER ...,     ...,        LPTGIP                  A4
      INTEGER ...,     NTRTYP,     NESTYP,     NMHTYP      A6
      INTEGER ...,     IDTRUK,     IDLUS ,     IDSDVH      A6
      INTEGER ...,     LTKCAR,     LSTCAR                  A8
      I...
      I...(ITRK)
      ITKTYP=...(ITRK)
      IMH...(ITRK)
      IF(IMH...)IMHETP=...+1
      IMH...
      LTIME=0
C
C         LOOP THROUGH CARGO TYPES FOR UNLOADING.
C
      DO ... I=1,NCARTP
C
C         CARGO TYPE ON TRUCK?
C
      IF(LTKCAR(ITRK,I).EQ.0) GO TO 20
C
C         FIND UNLOAD TIME.
C
      ITA...(I)
      LTIME=LTIME+...(ITAGTP,IMHETP,ITKTYP)*LTKCAR(ITRK,I)
C
C         UPDATE CARGO LOCATIONS.
C
      ...(...,I)=...(...,I)+LTKCAR(ITRK,I)
      LTKCAR(ITRK,I)=0
   20 CONTINUE
      ...(ITRK)
      RETURN
      END
```

```
      [illegible]  (IMPLIT[illegible])
C
C     WAITING CRAFT [illegible] TRUCK AN[illegible]
C     WAITING CRAFT,RANGE, AND CAUSEWAY HATCH [illegible]
C     [illegible] WHEN 1. TRUCK ARRIVES AT [illegible] 2. [illegible] RETURNED
C     [illegible] PARAMETER IMPREL INDICATES WHAT ASSIGNMENTS MUST
C     BE CHECKED. 0==TRUCK ARRIVES QUEUE, 1==[illegible] RETURNED TO
C     [illegible] RETURNED [illegible] RETURNED TO
C     [illegible]
C
C*****
      COMMON/A1/[illegible](1[illegible]),[illegible](1[illegible]),[illegible]L(100),NELEMT(6),[illegible](20),
     .  [illegible]L,NESTEL,MTIME,IEVTYP,IELEMT,IACTEL,INTCUM,INTPER,
     .LPTIME,[illegible]TIME,[illegible]INT,NTAPE,[illegible],NTAPE1,NTAPE2,IOUT,NTAPE3
      COMMON/A2/[illegible] WT(40),CAR[illegible]VL(40),CAR[illegible]T(40),[illegible]CARHL(40),NCGTA[illegible](40)
      COMMON/A3/[illegible](1[illegible]),[illegible]ARVI(10),CRAFSF(1[illegible],4),CRAFHT(10),NCRAFM(10
     .),[illegible]AT(1[illegible]),[illegible]TIM(10,40),[illegible]ILE(10),CRAFFS(10)
      COMMON/A4/[illegible]WT(10),TRKVL(1[illegible]),TRUKSP(10,2),NTCTIM(10,40),NFRTRK
     .(1[illegible],1[illegible]),[illegible](5),[illegible]PRY(1[illegible],10,13),MHTRK(30),LOGTIM(13,15,10),LO
     .[illegible]TM(13,15,1[illegible]),
     .  [illegible],IT[illegible],ITRUCK,NTRUKQ,NTRKPR
      COMMON/A5/[illegible](5),[illegible](5),IOSHIP(5),[illegible](20),IDHSLT(20),
     .[illegible](20),[illegible](20),[illegible]HATS(20),[illegible]STYP(20),MHATPL(20),IDCARH(20),NS
     .[illegible](20),[illegible]TIN(20),NHATIX(100),[illegible](100),[illegible]ACCES(100),NTOTAL(100),
     .[illegible]ITA(1[illegible],[illegible]),[illegible],
     .  I[illegible]
      COMMON/A6/[illegible](10),[illegible]TY(10),NLSTYP(1[illegible]),[illegible]MHTYP(15,3),IDCRAF(30
     .),I[illegible](5),I[illegible](5),I[illegible](20),
     .  [illegible]TP,[illegible]TP,[illegible]TP,[illegible]TP,NM[illegible]TP,NHTSTP,NCASHT,NMHEEL
     .,[illegible]T,[illegible]TP
      COMMON/A7/[illegible](5),[illegible]ST(5),ACAPST(5),LUSCHF(30),LUSTRK(30),LUSMH
     .[illegible],LUS[illegible],LUSSIT(15),L[illegible]TM(13,15,10),LSCTIM(13,15,10)
      COMMON/A8/[illegible]CAR(5,40),LIRCAR(30,40),LSTCAR(5,40)
      COMMON/A9/[illegible](30),LT[illegible](24),NS[illegible]T(40),[illegible]CAR(20),NFRCHC(15,10
     .,1[illegible]),
     .  [illegible],ISLCT,ICRAFT
      COMMON/A10/[illegible](1[illegible],10),LOADTM(10,10,15),
     .[illegible],[illegible],[illegible],NCMT,NSIMT,[illegible]LOC,NSIWT
      COMMON/A11/[illegible](40),NFLAT(20),
     .  [illegible],[illegible]TIME,[illegible],JHATCH,WEIGHT,VOLUME,L1,L5,CCUT,CCVL
     .  ,[illegible],NC[illegible],[illegible],FLOOR
      COMMON/A12/[illegible](30),[illegible](30),[illegible](15,10,1[illegible]),[illegible]MHE(15,10,1[illegible])
     .,[illegible](15),[illegible](10,2[illegible]),[illegible]T(10,1[illegible]),
     .  [illegible],NEL[illegible],[illegible]
```

```
      COMMON/[illegible]
     .[illegible]
     .[illegible]
     .[illegible]
C*****
      INTEGER*2[illegible],         [illegible],        [illegible],        [illegible]        A1
      INTEGER*2[illegible],         [illegible]                                                [illegible]
      INTEGER*2[illegible],         [illegible],        [illegible],        [illegible]        [illegible]
      INTEGER*2[illegible],         [illegible],        [illegible],        [illegible]        [illegible]
      INTEGER*2[illegible],         [illegible],        [illegible]                            [illegible]
      INTEGER*2[illegible],         [illegible],        [illegible],        [illegible]        A
      INTEGER*2[illegible],         [illegible],        [illegible],        [illegible]        A
      INTEGER*2[illegible],         [illegible],        [illegible],        [illegible]        A
      INTEGER*2[illegible],         [illegible],        [illegible],        [illegible]        [illegible]
      INTEGER*2[illegible]TAL,      [illegible],        [illegible]                            [illegible]
      INTEGER*2[illegible]TYP,      [illegible],        NETYP,              [illegible]TY      A[illegible]
      INTEGER*2[illegible],         ITRUK,              [illegible],        [illegible]        A[illegible]
      INTEGER*2LUS[illegible],      LUSTRK,             LU[illegible],      LU[illegible]      A7
      INTEGER*2LU[illegible]T,      LU[illegible]TM,    LU[illegible]TIM                       A7
      INTEGER*2LU[illegible],       LTK[illegible],     L[illegible]                           A[illegible]
      INTEGER*2LU[illegible],       L[illegible],       [illegible]                            A[illegible]
      INTEGER*2NF[illegible]
      INTEGER*2M[illegible]TIM,     L[illegible]TM                                             A1[illegible]
      INTEGER*2NC[illegible]M,      [illegible]                                                [illegible]
      INTEGER*2LUSQUE,              NFRC[illegible],    [illegible],        NFR[illegible]     A1[illegible]
      INTEGER*2LUSLTS,              L[illegible]TM,     LU[illegible]T                         A1[illegible]
      IFLAG=0
C
C           CHECK PARAMETER TO INDICATE WHAT ASSIGNMENTS MUST BE
C           CHECKED.
C
      IF(IMPREL.NE.0) GO TO 500
      ITRKTP=ITTRUK(IACTEL)
C
C           TRUCK ARRIVES QUEUE. LOOK FOR ASSIGNMENT OF THIS TRUCK TO
C           WAITING CAUSEWAY HATCH SLOT.
C
      L1=NCLKEL+NELEMT(3)+1
      L2=L1+NELEMT(4)-1
      DO 1[illegible] I=L1,L2
C
C           WAITING CAUSEWAY SLOT?
C
      IF((NEVTYP(I).NE.1[illegible]).OR.(N[illegible](I).GE.[illegible])) GO TO 1[illegible]
C
C           WAITING SLOT, IS ARRIVING TRUCK COMPATIBLE?
C
      ISLOT=I-L1+1
      ICHC[illegible]R=[illegible]CHC[illegible](ISLOT)
      KFRCAR=NFRCA[illegible](ICHC[illegible]R)
      ITACTP=[illegible]GTA[illegible](KFRCAR)
      I[illegible]TRK=[illegible]R[illegible](ITRKTP,ITACTP)
      IF(I[illegible]TRK.[illegible].0) GO TO 1[illegible]
C
C           TRUCK IS COMPATIBLE, ASSIGN TRUCK TO SLOT AND GENERATE
```

```
C           UNLOADING EVENT FOR HATCH SLOT.
C
C           UPDATE TRUCK CLOCK.
    5 ILUS=MHATNC(ISLOT)
      NCLOCK(IELEMT)=-PTIME
      NEVTYP(IELEMT)=5
      NOPEL(IELEMT)=ILUS
C           UPDATE HATCH SLOT CLOCK AND STATISTICS.
      NHSCUM(ISLOT,2)=NHSCUM(ISLOT,2)+PTIME+NCLOCK(I)
      NCLOCK(I)=PTIME
      LUSTRK(ILUS)=IACTEL
      OTIME=PTIME/3600.
      WRITE(NTAPE,10)IACTEL,ISLOT,OTIME,IPRTRK
   10 FORMAT(1X,5HTRUCK,I4,28H  ASSIGNED TO SHORESIDE SLOT,I4,4H  AT,F6.
     .2,17H  HOURS. PRIORITY,I4,12H  ASSIGNMENT)
      IFLAG=1
      GO TO 1000
  100 CONTINUE
C
C           LOOK FOR ASSIGNMENT OF TRUCK TO A BARGE WAITING AT A SEA
C           WALL.
C
      DO 200 I=L1,L2
      IF((NEVTYP(I).NE.11).OR.(NCLOCK(I).GE.0)) GOTO 200
C
C           WAITING BARGE. IS TRUCK COMPATIBLE?
C
C           FIND CARGO ON BARGE.
      INDEX=NOPEL(I)
      ISLOT=I-L1+1
      DO 140 J=1,NCARTF
      IF(NHITAB(INDEX,J).GT.0) GO TO 160
  140 CONTINUE
C           BARGE IS EMPTY-GENERATE BARGE EMPTY EVENT.
      WRITE(NPRINT,150)NDCP(INDEX),ISLOT
  150 FORMAT(1X,24HLOGIC ERROR- EMPTY BARGE,I4,15H  WAITS AT SLOT,I4)
      NCLOCK(I)=PTIME
      NEVTYP(I)=16
      GO TO 200
  160 KPRCAR=J
      ITAGTP=NCGTAG(KPRCAR)
      IPRTRK=NPRTRK(ITRKTP,ITAGTP)
      IF(IPRTRK.LE.0) GO TO 200
C           ASSIGN TRUCK
      GO TO 5
  200 CONTINUE
C
C           ASSIGN TRUCKS AND/OR MHE TO CRAFT WAITING FOR RETROGRADE
C           LOADING.
C
C           SEARCH THROUGH CRAFT CLOCK IN REVERSE ORDER TO FIND LARGE
C           CRAFT FIRST.
C
  500 JEVTYP=16
      L2=NELEMT(1)
      DO 710 I=1,L2
```



```
      J=L2-I+1
C
C           CRAFT WAITING FOR RETROGRADE.
C
      IF((NEVTYP(J).NE.16).OR.(NCLOCK(J).GE.0)) GO TO 700
      ILUS=NOPEL(J)
      ILUSTP=IDLUS(ILUS)
      JMHEPL=LUSMOC(ILUSTP)
      IF((IMHEPL.NE.0).AND.(IMHEPL.NE.JMHEPL)) GO TO 700
C
C           FIND CARGO AND TRANSFER TO TRUCK SELECTION ROUTINE
C
C           FIND SMALLEST CONTAINER TYPE.
      DO 510 K=1,NCARTF
      L=NCARTP-K+1
      IF(CARGCT(L).EQ.-1.)GO TO 520
  510 CONTINUE
      WRITE(NPRINT,515)
  515 FORMAT(1X,25HDATA ERROR- NO CONTAINERS)
      NCLOCK(J)=PTIME
      NEVTYP(J)=6
      GO TO 1000
  520 KPRCAR=L
C
C           TRUCK NOT WANTED IF CRAFT IS AT DEPOT.
C
      IF(IMHEPL.EQ.3) GO TO 540
      CALL TRKSEL
      IF(ITRUCK.EQ.0) GO TO 700
C
C           TRUCK AVAILABLE OR CRAFT AT DEPOT.
C
C           IS MHE REQUIRED?
  540 JMHETP=0
      ILSSTT=LUSSTT(ILLSTP)
      IF((ILSSTT.NE.2).AND.(ILSSTT.NE.3)) GO TO 600
C
C           MHE MAY BE REQUIRED.
C
C           LOOP THROUGH LUS-MHE PRIORITY MATRIX
      ICRTYP=IDCRAF(J)
      ITEST=ILUSTP
      ITAGTP=NCGTAG(KPRCAR)
  550 DO 570 K=1,NLUSPR
      IF(NPRLUS(K,ICRTYP,ITAGTP).NE.ITEST) GO TO 565
      JMHETP=NPRMHE(K,ICRTYP,ITAGTP)
      IF(JMHETP.EQ.0) GO TO 600
      IF(NMHTYP(JMHETP,JMHEPL).NE.0) GO TO 600
      GO TO 570
  565 IF(NPRLUS(K,ICRTYP,ITAGTP).EQ.0) GO TO 575
  570 CONTINUE
  575 IF(ITEST.NE.2) GO TO 700
      ITEST=3
      GO TO 550
C
C           TRUCK AND/OR MHE HAS BEEN FOUND SO THAT ASSIGNMENT CAN BE
```

```
C         MADE.
C
  600 ILUS=NOPEL(J)
      IF(ITRUCK.EQ.0) GO TO 630
C         ASSIGN TRUCK TO LUS.
      ISUB=ITRUCK+NELEMT(1)
      NEVTYP(ISUB)=0
      NOPEL(ISUB)=ILUS
      LUSTRK(ILUS)=ITRUCK
      NTKCUM(ITRUCK,2)=NTKCUM(ITRUCK,2)+MTIME+NCLOCK(ISUB)
      NCLOCK(ISUB)=-MTIME
      NTRUKG=NTRUKG-1
C
C         CHECK FOR MHE ASSIGNMENT
C
  630 IF(JMHETP.EQ.0) GO TO 650
C         ASSIGN MHE
      LUSMHE(ILUS)=JMHETP
      NMHTYP(JMHETP,JMHEPL)=NMHTYP(JMHETP,JMHEPL)-1
C
C         GENERATE CRAFT EVENT.
C
  650 NCRCUM(J,12)=NCRCUM(J,12)+MTIME+NCLOCK(J)
      NCLOCK(J)=MTIME
      WRITE(NTAPE,660)J,ILUS,JMHETP,ITRUCK
  660 FORMAT(1X,5HCRAFT,I4,8H  AT LUS,I4,31H  READY TO UNLOAD WITH MHE T
     .YPE,I4,7H  TRUCK,I4)
      GO TO 1000
  700 IF(JEVTYP.EQ.5) GO TO 901
  710 CONTINUE
C
C         ASSIGN TRUCKS AND/OR MHE TO CRAFT WAITING AT AN LUS.
      JEVTYP=-
      L2=NELEMT(1)
      DO 900 I=1,L2
      J=L2-I+1
C
C         IS CRAFT WAITING.
C
      IF((NEVTYP(J).NE.5).OR.(NCLOCK(J).GT.0)) GOTO 900
C
C         MHE RETURNED TO POOL NEAREST THIS CRAFT?
C
      ILUS=NOPEL(J)
      ILUSTE=IFLUS(ILUS)
      JMHEPL=LUSLOC(ILUSTE)
      IF((IMHEPL.NE.0).AND.(IMHEPL.NE.JMHEPL)) GO TO 900
      KPRCAR=NPRCCC(J)
      IF(IMHEPL.EQ.3) GO TO 540
C
C         SELECT BEST TRUCK FOR THIS CRAFT.
C
      CALL TRKSEL
C
C         TRUCK FOUND?
C
```



```
      IF(ITRUCK.NE.0) GO TO 540
C
C         NO TRUCK, IS A TRUCK REQUIRED?
C
      IF(CARCLT(KPRCAR).GT..1) GO TO 540
      IF((NCAPEL(KPRCAR).GE.3).AND.(ACAPST(JMHEPL).LT. CAPST(JMHEPL)))
     .GO TO 540
  900 CONTINUE
  901 CONTINUE
C
C         UPDATE CLOCK, IF REQUIRED.
C
 1000 IF(IFLAG.EQ.1) CALL MINCLK
      RETURN
      END
```

```
      SUBROUTINE WAITTR(IMHETP,IMHEPL)
C
C           WAITING TRUCK ASSIGNMENT--ASSIGNS TRUCKS WAITING FOR
C           UNLOADING AT THE ISS OR DEPOT. TRANSFERS TO EVENT6 TO
C           UNLOAD TRUCK AND GENERATE EVENT9-TRUCK(UNLOADED) LEAVES
C           ISS/DEPOT.
C
C*****
C
      COMMON/A1/NELECK(1[illegible]),NEVTYP(100),NOPEL(100),NELEMT(6),NCODE(20),
     *          NELKFL,NLSTEL,MTIME,IEVTYP,IELEMT,IACTEL,INTCUM,INTPER,
     *LOTIME,[illegible]TIME,PERINT,NTAPE,NCARD,NTAPE1,NTAPE2,IOUT,NTAPE3
C
      COMMON/A2/CA[illegible]WT(40),CARGVL(40),CARGCT(40),NCARHL(40),NCGTAG(40)
C
      COMMON/A3/CRAFWT(10),CRAFVL(10),CRAFSP(10,4),CRAFHT(10),NCRAFM(10
     *),[illegible]HEAT(10),[illegible]CITM(10,40),NFILE(10),CRAFES(10)
C
      COMMON/A4/TRUKWT(1[illegible]),TRKVL(10),TRUKSP(10,2),NTCITM(10,40),NPRTRK
     *(1[illegible],1[illegible]),NPET[illegible](30),MHEPRY(10,10,13),MHETRK(30),LDGTTM(13,15,10),LD
     *T[illegible]TM(13,15,1[illegible]),
     *          [illegible],IEPTRK,ITRUCK,NTRUKQ,NTRKPR
C
      COMMON/A5/[illegible](  5),NCHSHP(  5),IDSHIP(  5),NSHPHS(20),IDHSLT(20),
     *[illegible](20),L[illegible](20),NHATSS(20),NSTYP(20),NHATNC(20),IDCARH(20),NS
     *[illegible](20),[illegible](20),NHATIX(150),NDCH(100),NACCES(100),NTOTAL(100),
     *NHTTAB(1[illegible]),NSSSI(5),
     *          [illegible],LINDEX
C
      COMMON/A6/[illegible]TYP(10),NTKTYP(10),NLSTYP(15),NMHTYP(15,3),IDCRAF(30
     *),I[illegible]TRUK(3[illegible]),I[illegible]LUS(30),IDSDVH(20),
     *          NCARTP,NCHETP,NTRKTP,NLUSTP,NMHETP,NHTSTP,NCARHT,NMHEPL
     *,NLU[illegible],[illegible]
C
      COMMON/A7/[illegible](  3),CAPST(3),ACAPST(3),LUSCRF(30),LUSTRK(30),LUSMH
     *E(3[illegible]),LUSLOC(1[illegible]),LUSSIT(15),LDCGTM(13,15,10),LDCTTM(13,15,10)
C
      COMMON/A8/LCRCAR(30,40),LTKCAR(30,40),LSTCAR(3,40)
C
      COMMON/A9/LISTCR([illegible]),LISTHS(24),NSORT(30),NPRCAR(20),NPRCHC(10,10
     *,1[illegible]),
     *          [illegible],NLISHS,ISLOT,ICRAFT
C
      COMMON/A10/[illegible]TM(10,10),LOADTM(10,10,1[illegible]),
     *[illegible]T,[illegible],[illegible]TMEG,[illegible]PTM1[illegible],NSHT,NCIMT,NMHELOD,PSIWT
C
      COMMON/A11/CITEM(4  ),NPLAT(20),
     *          ETIME,LDTIME,JSLOT,JHATCH,WEIGHT,VOLUME,L1,L3,CCWT,CCVL
     *          ,I[illegible],NCNTR,CCFS,FLOOR
C
      COMMON/A12/LUSQUE(30),NPRCCG(30),NPRLUS(15,10,13),NPRMHE(15,10,13)
     *,LUSHTS(1[illegible]),LUSRTM(15,1[illegible]),LUSSDT(10,15),
     *          LUSCKG,NLUSPF,LUSOPN
C
      COMMON/A13/[illegible](30,1[illegible]),NTKCUM(30,9),MHECYC(15,3,2),MHECAR(15,3,
     *40),MHECUM(1[illegible],[illegible],4),LUSUSE(30,10),LUSCUM(30,2),NSTCUM(2,40),NHSCUM
     *(20,7),SH[illegible](20,10),NTRAFF(2),NCRCAR(30,40),INCCYC(30,2),KSTAT(30
     *,4,2),CSTAT(3[illegible],4,3)
C*****
      INTEGER*2NEVTYP,        NOPEL ,        NELEMT,        NCODE          A1
      INTEGER*2NCARHL,        NCGTAG                                       A2
      INTEGER*2NCRAFM,        MULHAT,        NCCITM,        NFILE          A3
      INTEGER*2NTCITM,        NPRTRK,        NPRTCG,        MHEPRY         A4
      INTEGER*2MHETRK,        LDGTTM,        LDTGTM                        A4
      INTEGER*2NHSSHP,        NCHSHP,        IDSHIP,        NSHPHS         A5
      INTEGER*2IDHSLT,        NCHCTR,        LOCHS ,        NHATSS         A5
      INTEGER*2NSTYP ,        NHATNC,        IDCARH,        NSROOM         A5
      INTEGER*2NSTIND,        NHATIX,        NDCH  ,        NACCES         A5
      INTEGER*2NTOTAL,        NHTTAB,        NSSSI                         A5
      INTEGER*2NCRTYP,        NTKTYP,        NLSTYP,        NMHTYP         A6
      INTEGER*2IDCRAF,        IDTRUK,        IDLUS ,        IDSDVH         A6
      INTEGER*2LUSCRF,        LUSTRK,        LUSMHE,        LUSLOC         A7
      INTEGER*2LUSSIT,        LDCGTM,        LDCTTM                        A7
      INTEGER*2LCRCAR,        LTKCAR,        LSTCAR                        A8
      INTEGER*2LISTCR,        LISTHS,        NSORT ,        NPRCAR         A9
      INTEGER*2NPRCHC                                                      A9
      INTEGER*2MOUNTM,        LOADTM                                       A10
      INTEGER*2NCITEM,        NPLAT                                        A11
      INTEGER*2LUSQUE,        NPRCCG,        NPRLUS,        NPRMHE         A12
      INTEGER*2LUSHTS,        LUSRTM,        LUSSDT                        A12
C
C           TRUCKS DO NOT WAIT AT THA
C
      IF(IMHEPL.EQ.1) GO TO 1000
C
C           MHE RETURNED TO ISS OR DEPOT.
C
      IPR=NTRKPR
      ITRK=0
C
C           LOOP THROUGH TRUCK CLOCK
C
      L1=NELEMT(1)+1
      L2=L1+NELEMT(2)-2
      DO 600 I=L1,L2
C
C           IS TRUCK WAITING AT APPROPRIATE STORAGE AREA?
C
      IF((NEVTYP(I).EQ.8).AND.(NCLECK(I).LT.0).AND.(NOPEL(I).EQ.IMHEPL))
     *GO TO 10
      GO TO 600
C
C           TRUCK IS WAITING AT THIS STORAGE AREA. IS NEWLY RETURNED
C           MHE ACCEPTABLE?
C
   10 ISUB=I-NELEMT(1)
      ICARTP=NPRTCG(ISUB)
      ITAGTP=NCGTAG(ICARTP)
      ITKTYP=IDTRUK(ISUB)
      DO 500 J=1,IPR
C
C           IS THIS PRIORITY MHE TYPE SAME AS NEWLY RETURNED MHE?
```

```
C
      IF(MH(PRYE..ITKTYP,ITASTP).EQ.IMHETP) GO TO 510
 500  CONTINUE
      GO TO 600
C
C              NEW MINIMUM PRIORITY HAS BEEN FOUND. SET NEW TRUCK.
C
 510  ITRK=I-NELEMT(1)
      IPR=J
C
C              PRIORITY=1?
C
      IF(IPR.EQ.1) GO TO 700
 600  CONTINUE
C
C              IS THERE A WAITING TRUCK TO BE ASSIGNED?
C
      IF(ITRK.EQ.0) GO TO 1000
C
C              UPDATE STATISTICS.
C
 700  I=ITRK+NELEMT(1)
      NTKCUM(ITRK,8)=NTKCUM(ITRK,8)+MTIME-NCLOCK(I)
C
C              CALL EVENT8 TO UNLOAD TRUCK
C
      CALL EVENT8(IMHETP,IMHEPL,ITRK)
 1000 RETURN
      END
```



```
      SUBROUTINE SCLICK
C
C     WRITES EVENT CLOCKS AND STATE OF SYSTEM FOR DEBUGGING PURPOSES.
C
C*****
C
      COMMON/A01/NCLOCK(   ),NEVTYP(   ),NOPEL(150),NELEMT(6),NCODE(20),
     *        NCLKEL,NE   EL,MTIME,IEVTYP,IELEMT,IACTEL,INTCUM,INTPER,
     *LPTIME,LSTIME,NPRINT,NTAPE,NCARD,NTAPE1,NTAPE2,IOUT,NTAPE3
C
      COMMON/A05/NSHP( 5),NCHSHP( 5),IDSHIP( 5),FSHPHS(20),IDHSLT(20),
     *NCHC  (20),LOCHS(20),NHATSS(20),NSTYP(20),NSTINC(20),IDCARH(20),NS
     *POOM(20),NETINC(20),NHATIX(100),NDCH(100),NACCES(100),NTOTAL(100),
     *NHTTAB(100,40),NESSI(5),
     *             ICHCOR,LINDEX
C
      COMMON/A06/NCRTYP(15),NTKTYP(15),NLSTYP(15),NMHTYP(15,5),IDCRAF(50
     *),IDTRUK(30),IDLUS(30),IDSUVH(20),
     *               NCARTP,NCRETP,NTKETP,NLUSTP,NMHETP,NMHTSTP,NCARHT,IMHEPL
     *,NLUS,NSI,NTACTF
C
      COMMON/A07/DIST( 9),CAPST(3),ACAPST(3),LUSCRE(30),LUSTRK(30),LUSMH
     *E(30),LUSLOC(15),LUSSTT(15),LOCSTM(17,15,10),LOCTTM(13,15,15)
C
      COMMON/A08/LCRCAR(30,40),LTKCAR(30,40),LSTCAR(5,40)
C*****
      INTEGER*2NEVTYP,      NOPEL ,       NELEMT,       NCODE        A1
      INTEGER*2NESSHP,      NCHSHP,       IDSHIP,       NSHPHS       A1
      INTEGER*2IDHSLT,      NCHCOR,       LOCHS ,       NHATSS       A4
      INTEGER*2NSTYP ,      NEATNC,       IDCARH,       NSPOOM       A5
      INTEGER*2NSTINC,      NHATIX,       NDCH  ,       NACCES       A6
      INTEGER*2NTOTAL,      NHTTAB,       NESSI                      A7
      INTEGER*2NCRTYP,      NTKTYP,       NLSTYP,       NMHTYP       A6
      INTEGER*2IDCRAF,      IDTRUK,       IDLUS ,       IDSUVH       A6
      INTEGER*2LUSCRE,      LUSTRK,       LUSMHE,       LUSLOC       A7
      INTEGER*2LUSSTT,      LOCSTM,       LOCTTM                     A7
      INTEGER*2LCRCAR,      LTKCAR,       LSTCAR                     A8
C
C     HEADING FOR EVENT CLOCKS
      WRITE(NPRINT,10)
   10 FORMAT(1H1,4X,11HELEMENT NO.,3X,10HEVENT TIME,5X,10HEVENT TYPE,2X,14H
     *OP. ELEMT. NO,6X,9HID NUMBER,3X,12HCRAFT/TRUCK/,13X,5HSTATE,6X,9HS
     *TATE NO./81X,11HHATCH TYPE)
C
C     WRITE CRAFT CLOCK
C
      WRITE(NPRINT,20)
   20 FORMAT(1X/1X,11HCRAFT CLOCK)
      L2=NELEMT(1)
      DO 40 I=1,L2
      OTIME=NCLOCK(I)/3600.
   40 WRITE(NPRINT,300) I,OTIME,NEVTYP(I),NOPEL(I),I,IDCRAF(I)
C
C     WRITE TRUCK CLOCK
C
      WRITE (NPRINT,50)
```

```
   50 FORMAT(1X,11HTRUCK CLOCK)
      L2=NELEMT(2)-1
      DO 60 I=1,L2
      L3=NELEMT(1)+I
      OTIME=NCLOCK(L3)/3600.
   60 WRITE(NPRINT,300)L3,OTIME,NEVTYP(L3),NOPEL(L3),I,IDTRUK(I)
C
C     WRITE NCLKEL
C
      WRITE(NPRINT,70)
   70 FORMAT(1X,14HNCLKEL ELEMENT)
      OTIME=NCLOCK(NCLKEL)/3600.
      WRITE(NPRINT,300)NCLKEL,OTIME,NEVTYP(NCLKEL),NOPEL(NCLKEL)
C
C     WRITE SHIP ARRIVAL CLOCK
C
      WRITE(NPRINT,80)
   80 FORMAT(1X,10HSHIP CLOCK)
      L2=NELEMT(3)
      IPR=
      DO 100 I=1,L2
      L3=NCLKEL+I
      OTIME=NCLOCK(L3)/3600.
  100 WRITE(NPRINT,300) L3,OTIME,NEVTYP(L3),IPR,I
C
C     WRITE HATCH SLOT CLOCK
C
      WRITE(NPRINT,110)
  110 FORMAT(1X,16HHATCH SLOT CLOCK)
      L2=NELEMT(4)
      DO 130 I=1,L2
      L3=NCLKEL+NELEMT(3)+I
      OTIME=NCLOCK(L3)/3600.
  130 WRITE(NPRINT,300)L3,OTIME,NEVTYP(L3),NOPEL(L3),I,IDHSLT(I),NHATSS(
     .I),NHATNO(I)
C
C     WRITE SP VEHICLES CLOCK
C
      IF(NELEMT(5).EQ.0) GO TO 145
      WRITE(NPRINT,135)
  135 FORMAT(1X,16HSP VEHICLE CLOCK)
      L2=NELEMT(5)
      DO 140 I=1,L2
      L3=NCLKEL+NELEMT(3)+NELEMT(4)+I
      OTIME=NCLOCK(L3)/3600.
  140 WRITE(NPRINT,300)L3,OTIME,NEVTYP(L3),NOPEL(L3),I,IDSDVH(I)
C
C           WRITE CLOCK LEGEND
C
  145 WRITE(NPRINT,150)
  150 FORMAT(1X//1X,14HCLOCK LEGEND--/1X,12HEVENT TYPES-,48X,26H-STATE-=
     .HATCH SLOT STATE--/3X,41H1-   CRAFT ARRIVES -OR WAITS- AT SHIP-S O
     .,19X,54H0-   HATCH SLOT IS AN LUS OR A CAUSEWAY, STATE NO.=LUS/3X,
     .26H2-   CRAFT LEAVES HATCH SLOT,32X,25H1-   SLOT HAS NOT ARRIVED/3
     .X,39H3-   CRAFT ARRIVES -OR WAITS- AT LUS 0,22X,11H2-   CLOSED
     .              /3X,25H4-   CRAFT ARRIVES AT LUS,35X,22H3-   EMPTY
```



```
     .OR DEPART/3X,47H5-   CRAFT LEFT -OR WAITS- AT LUS,27X,22H4-   OP
     .EN - OCCUPIED-/3X,21H6-   CRAFT LEAVES LUS,39X, 56H5-   BLOCKED
     .BY A MULTI-HATCHED CRAFT AT SLOT= STATE NO./3X,34H7-   TRUCK -LOAD
     .ED- LEAVES THA/ISS,26X,24H6-   CLOSED AND BLOCKED/3X,37H8-   TRUCK
     . -LOADED- ARRIVES ISS/DEPOT,23X,34H7-   SAVED FOR MULTI-HATCHED CR
     .AFT)
      WRITE(NPRINT,160)
  160 FORMAT(3X,38H9-   TRUCK -UNLOADED- LEAVES ISS/DEPOT,22X,41H8-   SA
     .VED FOR BLOCKING -3-HATCHED CRAFT ONLY-/2X,31H10-   CAUSEWAY HATCH
     . SLOT OPENS,30X,22H9-   EMPTY AND BLOCKED/2X,48H11-   BARGE READY
     .TO DISCHARGE CARGO AT SEA WALL,12X,24H10-   OCCUPIED BY CRAFT.,
     .20H   CRAFT ID=STATE NO.
     .       /2X,45H12-   TRUCK ARRIVES -OR WAITS- AT TRUCK QUEUE,15X,64H
     .11-   SAVED FOR BLOCKING AND CLOSED -3-HATCHED CRAFT ONLY-/2X,40H1
     .3-   SD VEHICLE CONVOY ARRIVES AT DEPOT,20X,57H12-   SAVED FOR BLO
     .CKING AND EMPTY -3-HATCHED CRAFT ONLY-/2X,18H14-   SHIP ARRIVAL/2X
     .,45H15-   HATCH SLOT OPENS                 ,15X,56HOP. ELEMT
     . NO--   HATCH SLOT ID, LUS NUMBER, STORAGE AREA/2X,43H16-   CRAFT
     .LEFT AT LUS FOR RETROGRADE ONLY,17X,5 NUMBER, FROM TYPE ASSOCIATE
     .D WITH EVENT TYPE, WHERE)
      WRITE(NPRINT,170)
  170 FORMAT(2X,34H17-   CAUSEWAY HATCH SLOT IS EMPTY,26X,13HAPPLICABLE/
     .2X,52H18-   BARGE AT SEA WALL IS EMPTY AND READY TO DEPART/
     .1X,30H19-   CRAFT LEFT AT HATCH SLOT)
C
C     WRITE LUS STATES
C
C
  180 WRITE(NPRINT,200)
  200 FORMAT     (1H1,10HLUS STATES/6X,10HLUS NUMBER,7X,8HLUS TYPE,7X,8H
     .CRAFT ID,7X,8HTRUCK ID,7X,8HSHE TYPE)
      DO 230 I=1,NLUS
  230 WRITE(NPRINT,310)I,IDLUS(I),LUSCRF(I),LUSTRK(I),LUSMHE(I)
C
C
C     WRITE CARGO LOCATIONS
C
C
      WRITE(NPRINT,240)(I,I=1,NCARTP)
  240 FORMAT(1H1,17HCARGO LOCATIONS--/1X,23(1H-),12HCARGO MODULES(1H-)/
     .1X,32I4/1X,32I4)
      WRITE(NPRINT,241)
  241 FORMAT(1X,128(1H-))
C     WRITE HATCH TABLES
      WRITE(NPRINT,246)
  246 FORMAT(1X,12HHATCH TABLES)
      DO 250 I=1,LINDEX
      IF(NTOTAL(I).EQ.0) GO TO 250
      WRITE(NPRINT,251)I,NHATIX(I),NDCB(I),NACCES(I),NTOTAL(I)
      WRITE(NPRINT,320)(NHTTAB(I,J),J=1,NCARTP)
  250 CONTINUE
  251 FORMAT(1X/1X,6HINDEX=,I3,8H  HATCH=,I2,19H  DECK-CELL-BARGE=,I3,12
     .H    ACCESS.=,I2,14H  TOTAL ITEMS=,I4)
C
C     WRITE CRAFT CARGO
C
```

```
      WRITE(NPRINT,256)
  256 FORMAT(1X/1X,11HCRAFT CARGO)
      L2=NELEMT(1)
      DO 260 I=1,L2
      DO 258 K=1,NCARTP
      IF(LCRCAR(I,K).NE.0) GO TO 259
  258 CONTINUE
      GO TO 260
  259 WRITE(NPRINT,261) I
      WRITE(NPRINT,320)(LCRCAR(I,J),J=1,NCARTP)
  260 CONTINUE
  261 FORMAT(1X/1X,12HCRAFT NUMBER,I3)
C
C     WRITE TRUCK CARGO
C
      L2=NELEMT(2)-1
      WRITE(NPRINT,266)
  266 FORMAT(1X/1X,11HTRUCK CARGO)
      DO 270 I=1,L2
      DO 268 K=1,NCARTP
      IF(LTKCAR(I,K).NE.0) GO TO 269
  268 CONTINUE
      GO TO 270
  269 WRITE(NPRINT,271) I
      WRITE(NPRINT,320)(LTKCAR(I,J),J=1,NCARTP)
  270 CONTINUE
  271 FORMAT(1X/1X,12HTRUCK NUMBER,I3)
C
C     WRITE THA/ISS/DEPOT CARGO
C
      WRITE(NPRINT,276)
  276 FORMAT(1X/1X,15HTHA/ISS/DEPOT CARGO)
      DO 280 I=1,3
      WRITE(NPRINT,281) I
  280 WRITE(NPRINT,320)(LSTCAR(I,J),J=1,NCARTP)
  281 FORMAT(1X/1X,15HSTORAGE AREA NUMBER,I2)
      RETURN
  300 FORMAT(1X,I10,F15.2,6I15)
  310 FORMAT(1X,5I15)
  320 FORMAT(1X,32I4/1X,32I4)
      END
```